A/UX® Installation Guide

Production draft
1/31/89

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Developer Technical Publications

This Document contains preliminary information.

It does not include:

- table of contents
- final technical information
- final editorial corrections
- final art
- a glossary

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Preface

This guide provides information for installing A/UX® Release 1.1, either as a new A/UX system or as an update to an existing A/UX Release 1.0 system. The guide contains *all* the instructions necessary to complete the procedure required for the type of system you have. Even if you are not a programmer or an experienced system administrator, you can use this guide to set up your computer and A/UX. For now, set aside the accessory kit that came with the Macintosh II or Macintosh IIx and the other Apple® manuals that came with your equipment, which may include an external hard disk, tape backup device, monitor, and cables.

A/UX is a version of the industry standard AT&T UNIX® System V Release 2 operating system created by Apple Computer to run on Macintosh II and Macintosh IIx computers. A/UX also incorporates extensions from the 4.2 and 4.3 Berkeley Software Distribution (BSD) versions of the UNIX operating system and Apple's own enhancements to the UNIX environment.

This guide contains information that applies to a wide variety of configurations. Figure P-1 shows the basic configurations of hardware and the types of installation media available for A/UX 1.1.

This guide is organized according to the installation process that you follow. Use only the sections that apply to the type of media you purchased and the type of installation or update that you are performing.

Figure P-1
Hardware configurations and installation media

Who should read this guide

This guide is intended for the person responsible for the hardware setup and initial software startup of A/UX. In the past, a site running the UNIX operating system usually had an expert administrator to install and maintain the system for all other users. The power of the UNIX operating system is available to single users through the porting and adaptation of UNIX to desktop computers like the Macintosh. If you're the sole user of your system, you are also the system administrator.

To handle the complexity involved in administering the multitasking, multi-user environment of A/UX, you should already have some experience and familiarity with computers. This guide assumes that you already know basic computer terms and concepts. Even if you are unfamiliar with the UNIX operating system or the Macintosh Operating System (OS), you can find the information you need in this guide to install or update to A/UX 1.1 on your Macintosh II or Macintosh IIx computer.

How A/UX is supplied

A/UX is distributed in one of several ways, as shown in Figure P-2. It may be

- factory-installed on an internal Apple HD 80SC

  If you're new to UNIX, set aside about two hours to start and complete the standard installation with A/UX factory-installed on an internal hard disk. You will probably spend much of this time setting up the computer.

- factory-installed on an external Apple HD 80SC

  If you have A/UX factory-installed on an external hard disk and you're new to UNIX, allow about two hours to start and complete the standard installation. You will probably spend much of this time setting up the computer.

- supplied on a tape cartridge as the A/UX 1.1 Tape Product

  If you purchased A/UX on a tape cartridge, allow about four hours to start and complete the standard installation. You will probably spend much of this time setting up the computer. Once begun, the tape installation can proceed unattended.

❖ *Note:* The Tape Backup 40SC device does not come as a part of the A/UX Tape Product. You must purchase it separately.

  If you are using the Tape Product to update an A/UX 1.0 system to an A/UX 1.1 system, allow yourself about four hours.

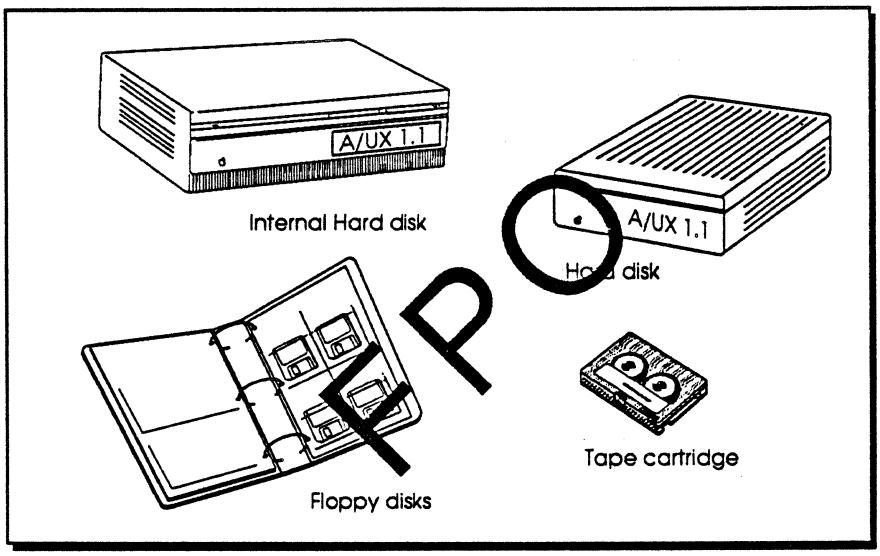

Figure P-2
A/UX distribution products

- supplied on a set of 3.5-inch disks as the A/UX 1.1 Floppy Product

  If you purchased A/UX on a set of 3.5-inch disks, allow yourself about four hours to start and complete the standard installation. You will probably spend much of this time setting up the computer. The 3.5-inch disk installation requires someone to insert disks during the installation.

  If you are using the Floppy Product to update an A/UX 1.0 system to A/UX 1.1, allow yourself about four hours.

A summary of factory-installed A/UX installation

Configuring a factory-installed A/UX 1.1 system is straightforward. First you set up the hardware, start up the system, and set a few system-specific details to get ready to run A/UX. Then you run A/UX for the first time, configure your system to run in your local area, and set up a few system security measures. During the installation process you use several standard Macintosh procedures and invoke several common UNIX commands. This guide explains these procedures and commands in step-by-step detail.

A summary of new installation from Tape or Floppy Product

Installing a new A/UX 1.1 system using the A/UX Tape Product or Floppy Product is straightforward. First you set up the hardware, start up the system, and then you prepare the hard disk to receive A/UX. Next you install the software from the tape cartridge or 3.5-inch disks and set a few system-specific details to get ready to run A/UX. Then you run A/UX for the first time and configure your system to run in your local area. Next you set up a few system-security measures. During the installation process you use several standard Macintosh procedures and invoke several common UNIX commands. This guide explains these procedures and commands in step-by-step detail.

A summary for performing an update from A/UX 1.0 to A/UX 1.1

Updating an existing A/UX 1.0 system to A/UX 1.1 using the A/UX Tape Product or A/UX Floppy Product is a little complex. First you start up your system, and then you organize your hard disk by saving several essential A/UX 1.0 files and removing other files that will be obsolete when you install A/UX 1.1. Next you install A/UX 1.1 from the tape cartridge or 3.5-inch disks. To complete the update process you restore the files that you saved previously and then rebuild the kernel, if appropriate. During the installation process you use several standard Macintosh procedures and invoke several common UNIX commands. This guide explains these procedures and commands in step-by-step detail.

What you need

In addition to the A/UX operating system and its utilities, you need this guide, hardware configured for your A/UX system, and several other 3.5-inch disks to install A/UX. Several disks come in the Accessory Kit that is packed with the A/UX product you purchased. If you purchased the Tape Product or Floppy Product, the kits contain additional 3.5-inch disks.

The A/UX Accessory Kit

The A/UX Accessory Kit contains the following items:

- *A/UX Installation Guide*
- *Road Map to A/UX Documentation*
- *A/UX 1.1 Release Notes*
- *Packing List*
- *A/UX System Setup and ReadMe* disk

  This 3.5-inch disk contains Macintosh Operating System startup files, the utilities you need to prepare your hard disk for A/UX, and a ReadMe file that provides any information that may have changed or been added since the manuals in the A/UX documentation suite were published. Chapter 2 explains how to examine the file on this disk for late-breaking technical information about A/UX 1.1.

- *A/UX Stand-Alone Shell* disk

  This 3.5-inch disk contains utilities to use as a backup for starting and troubleshooting A/UX should there be problems with your hard disk.

- *Tape Backup 40SC* disk

  This disk includes utilities for making tape cartridge copies of a hard disk containing Macintosh OS files or a hard disk partitioned for A/UX.

- *A/UX System Checker*

  This 3.5-inch disk contains a utility for checking the A/UX system files on your system and reporting which ones have changed. You use this information when you update A/UX 1.0 to A/UX 1.1.

- *A/UX Data Encryption Standard (DES)* disk

  Utilities on this 3.5-inch disk allow you to encrypt your data for security purposes.

❖ *Note:* This disk is shipped only to customers in the U.S. and Canada.

Figure P-3 shows the A/UX Accessory Kit.

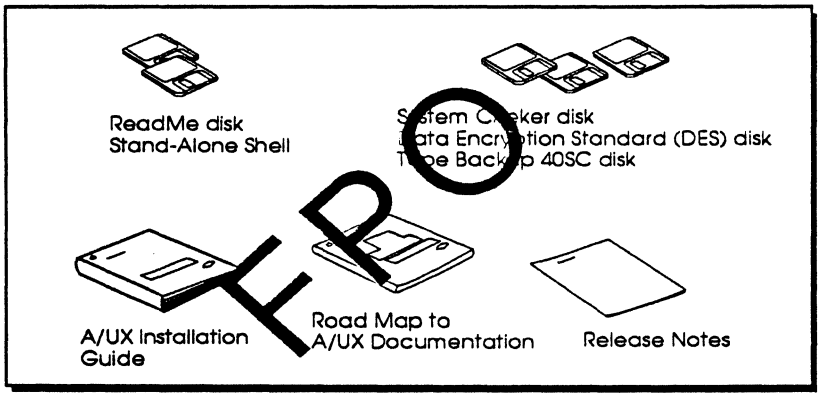

Figure P-3
A/UX Accessory Kit

The A/UX Tape Product

The A/UX Tape Product contains the following software:

- The *A/UX `sash` and Utilities* disk

  This 3.5-inch disk contains useful stand-alone maintenance utilities.

- The *A/UX Floppy Launch* disk

  This 3.5-inch disk contains a stand-alone A/UX shell, a kernel, and a few utilities for letting you install A/UX from a tape cartridge.

- The *A/UX Floppy Root* disk

  This 3.5-inch disk contains a minimal A/UX file system to be used for installing A/UX from the tape cartridge.

- The *A/UX Release 1.1 Installation* tape cartridge

  This tape cartridge contains the complete A/UX operating system and utilities in compressed `cpio` format.

Figure P-4 shows the A/UX Tape Product.

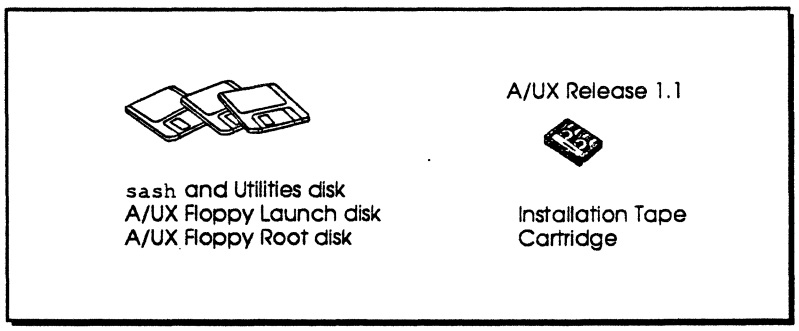

Figure P-4
The A/UX Tape Product

The A/UX Floppy Product

The A/UX Floppy Product contains the following software:

- The *A/UX `sash` and Utilities* disk

  This 3.5-inch disk contains useful stand-alone maintenance utilities.

- The *A/UX Floppy Launch* disk

  This disk contains a stand-alone A/UX shell, a kernel, and a few utilities for letting you install A/UX from the set of 3.5-inch disks.

- The *A/UX Floppy Root* disk

  This disk contains a minimal A/UX file system to be used for installing A/UX from a set of 3.5-inch disks.

- The *A/UX File Index* disk

  This disk contains a comprehensive listing of all the files in the A/UX Floppy Product.

- The *A/UX Release 1.1* installation disks

  These 3.5-inch disks contain the full A/UX operating system and utilities in compressed `cpio` format.

Figure P-5 shows the A/UX Floppy Product.

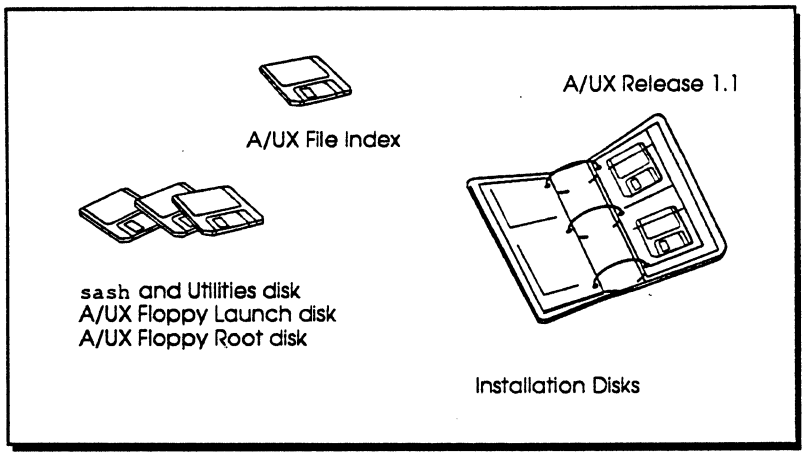

Figure P-5
The A/UX Floppy Product

Hardware requirements

Because of the processing demands of A/UX, your Macintosh II or Macintosh IIx requires the hardware listed here. If you have any questions about these requirements, ask your Apple representative for more information. Figure P-6 shows the required hardware.

- A Macintosh II or Macintosh IIx computer with at least one 3.5-inch disk drive and an 80 MB Apple HD 80SC hard disk (internal or external).
- A video card.
- A monochrome or color monitor with cables.
- A keyboard, mouse, and Apple Desktop Bus™ (ADB) cables. Apple offers a choice of keyboards.
- If you have a Macintosh II, your dealer installed a 68851 PMMU (paged memory management unit) in place of the AMU (address mapping unit) normally shipped with the Macintosh II.

❖ *Note:* The Macintosh IIx uses a 68030 processor that has a built-in PMMU. If you have a Macintosh IIx, *do not* have a 68851 PMMU installed.

If your Macintosh II does not have a PMMU installed, an error message to this effect appears soon after you try to start A/UX. If this happens you should contact your Apple representative.

- At least 2 megabytes (MB) of main memory, instead of the 1 MB configuration standard for the Macintosh II (the Macintosh IIx comes with 4 MB).

❖ *Note:* If your system does not meet the 2 MB minimum requirement, a warning about insufficient memory appears soon after you try to start A/UX. If this happens, contact your authorized Apple representative.

For each user you add to your system, an additional 2 MB of memory is recommended. If you plan to use networking facilities, add 2 MB more memory.

You also receive an accessory kit with the Macintosh II or Macintosh IIx. Figure P-7 shows the contents of this accessory kit. You can put it aside for now. You will not need it to install A/UX.

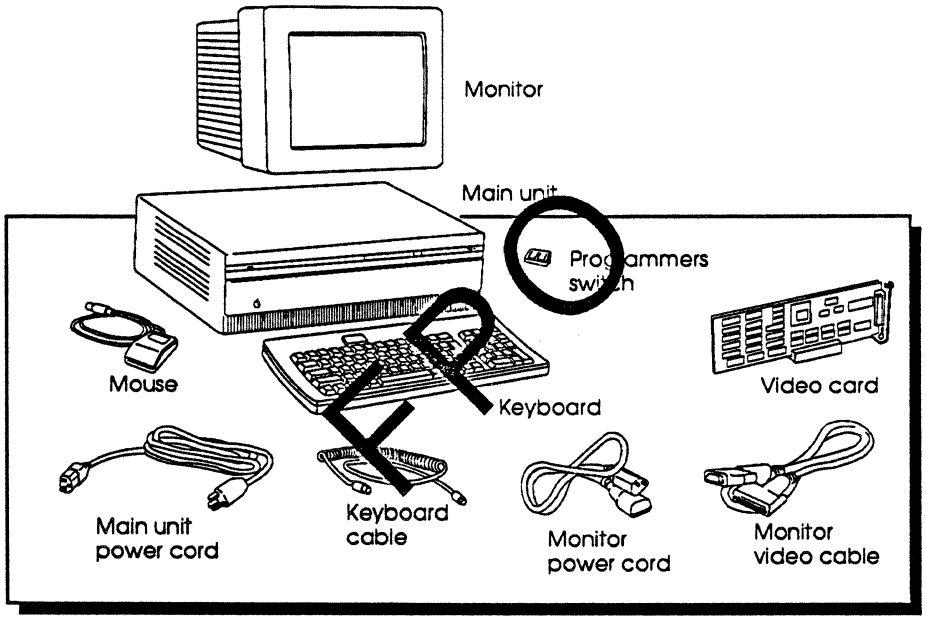

Figure P-6
Hardware requirements

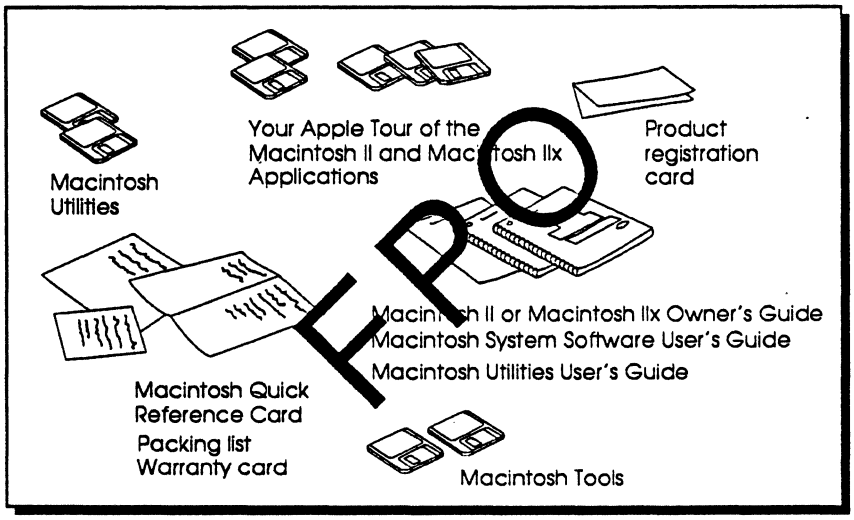

Figure P-7
Macintosh II or Macintosh IIx Accessory Kit

Hardware options

If you purchased A/UX on an external HD 80SC, A/UX Floppy Product, or A/UX Tape Product, you may need some of the following:

- Apple Tape Backup 40SC device
- The Apple SCSI Cable System, including cables and Cable Terminators

Figure P-8 shows this optional hardware.

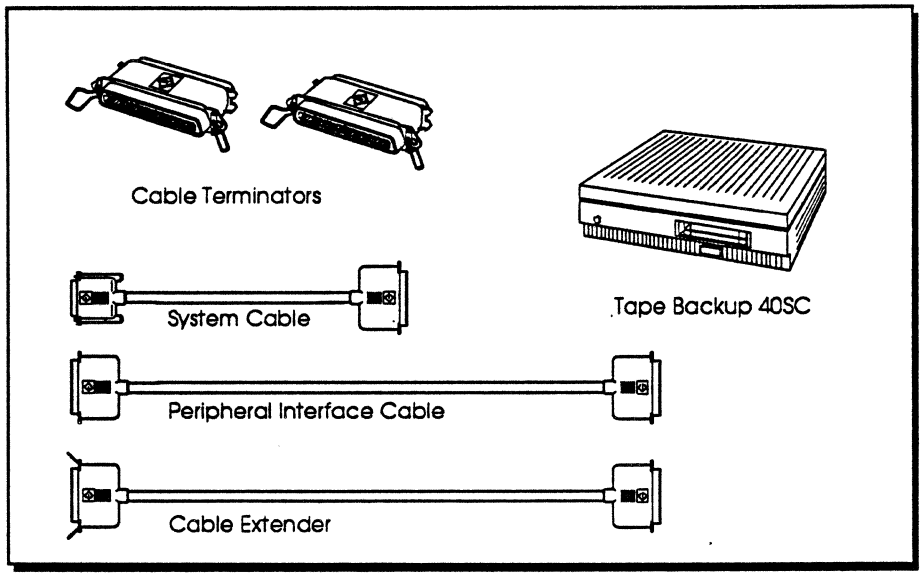

Figure P-8
Optional hardware

What you should read

This guide contains all the instructions for all the types of installations and updates you can perform. The guide is organized sequentially in the order that you perform the procedures. However, depending on your A/UX system, you may need to complete only certain chapters of the guide and certain sections in the chapters. Look at Table P-1 to determine which parts of the guide you need to read and complete and which chapters you can skip. Each section contains a pointer to the next section you need to use.

At many points, this guide tells you whether you can skip the next step, section, or chapter, and directs you to the place to go next for further instructions.

Table P-1
What you should read

What you have	Preface	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7
Factory-installed	X	X	X			X	X	X
Tape Product	X	X	X	X	X	X	X	X
Tape Update	X	X	X	X	X	X	X	X
Floppy Product	X	X	X	X	X	X	X	X
Floppy Update	X	X	X	X	X	X	X	X

Conventions

A/UX guides follow certain conventions regarding presentation of information. Words or terms that require special emphasis appear in specific fonts within the text of the manual. The following sections explain the conventions used in this manual.

Significant fonts

Words that you see on the screen or that you must type exactly as shown appear in Courier. For example, when you begin an A/UX work session, you normally see the following on the screen:

```
login:
```

The text shows `login:` in Courier to indicate that it appears on the screen. If the next step in the manual is

Enter `start`

`start` appears in Courier to indicate that you must type the word. Words that you must replace with a value appropriate to a particular set of circumstances appear in *italics*. Using the example just described, if the next step in the manual is

`login:` *username*

you type your name — `laura`, for example — so the screen shows:

```
login: laura
```

Key presses

Certain keys are identified with names on the keyboard. These modifier and character keys perform functions, often in combination with other keys. In the manuals, the names of these keys appear in the format of an Initial Capital letter followed by SMALL CAPITAL letters.

The list that follows provides the most common keynames.

RETURN	DELETE	SHIFT	ESCAPE
OPTION	CAPS LOCK	CONTROL	

For example, if you enter

```
Applee
```

instead of

```
Apple
```

you would position the cursor to the right of the word and press the DELETE key once to erase the additional *e*.

For cases in which you use two or more keys together to perform a specific function, the keynames are shown connected with hyphens. For example, if you see

Press CONTROL-C

you must press CONTROL and C simultaneously (CONTROL-C normally cancels the execution of the current command).

Terminology

In A/UX manuals, a certain term can represent a specific set of actions. For example, the word *Enter* indicates that you type in an entry and press the RETURN key. If you were to see

Enter the following command: `whoami`

you would type `whoami` and press the RETURN key. The system would then respond by identifying your login name.

Here is a list of common terms and their corresponding actions.

Table P-2
Key press terms and actions

Term	Action
Enter	Type the entry and press the RETURN key.
Press	Press a *single* letter or key *without* pressing the RETURN key.
Type	Type the letter or letters *without* pressing the RETURN key.
Click	Press and then immediately release the mouse button.
Select	Position the pointer on an item in a list or group and click the mouse button.
Drag	Position the pointer on an icon, press and hold down the mouse button while moving the mouse. Release the mouse button when you reach the desired position.
Choose	Activate a command title in the menu bar. While holding down the mouse button, drag the pointer to a command name in the menu and then release the mouse button. An example is to drag the File menu down until the command name Open appears highlighted and then release the mouse button.

Syntax notation

A/UX commands follow a specific order of entry. A typical A/UX command has this form:

command [*flag-option*] [*argument*]...

Table P-3 describes the different elements of an A/UX command.

Table P-3
Syntax Notation

Element	Description
command	Is the command name.
flag-option	Is one or more optional arguments that modify the command. Most flag-options have the form [-*opt*...] where *opt* is a letter representing an option. Commands can take one or more options.
argument	Is a modification or specification of the command; usually a filename or symbols representing one or more filenames.
brackets ([])	Surround an optional item — that is, an item that you do not need to include for the command to execute.
ellipses (...)	Follow an argument that may be repeated any number of times.

For example, the command to list the contents of a directory (`ls`) is followed below by its possible flag options and the optional argument *names*:

```
ls [-R] [-a] [-d] [-C] [-x] [-m] [-l] [-L] [-n] [-o] [-g] [-r]
[-t] [-u] [-c] [-p] [-F] [-b] [-q] [-i] [-s] [names]
```

You can enter

```
ls -a /users
```

to list all entries of the directory `/users` where

`ls`	represents the command name
`-a`	indicates that *all* entries of the directory be listed
`/users`	names which directory is to be listed

Command reference notation

The manuals *A/UX Command Reference*, *A/UX Programmer's Reference*, and *A/UX System Administrator's Reference* contain references for commands, programs, and other related information. Reference material is organized within these manuals by section numbers. The standard A/UX cross-reference notation is

cmd(sect)

where *cmd* is the name of the command, file, or other facility; *sect* is the section number where the entry resides.

- Commands followed by section numbers (1M), (7), or (8) are listed in *A/UX System Administrator's Reference.*
- Commands followed by section numbers (1), (1C), (1G), (1N), and (6) are listed in *A/UX Command Reference.*
- Commands followed by section numbers (2), (3), (4), and (5) are listed in *A/UX Programmer's Reference.*

For example,

`cat(1)`

refers to the command `cat`, which is described in Section 1 of *A/UX Command Reference.*

References also can be displayed on the screen. The `man` or `apropos` command displays pages from reference manuals directly on the screen. For example, enter the command

```
man cat
```

In this example, the manual page for the `cat` command, including its description, syntax, options, examples and other pertinent information, appears on the screen. To exit, continue pressing the SPACE BAR until you see your command prompt, or press Q at any time to return immediately to your command prompt.

An A/UX manual often refers to information discussed in another manual in the suite. The format for this type of reference is "Chapter Title," *Name of Manual.*

For a complete description of A/UX manuals, see *Road Map to A/UX Documentation.* This guide contains descriptions of each A/UX manual, the part numbers, and ordering information for all the manuals in the A/UX documentation suite.

Chapter 1

Setting Up Your Hardware

This chapter describes how to unpack and set up your Macintosh® II computer or Macintosh IIx computer and add any SCSI devices you might need, such as the HD 80SC or the Tape Backup 40SC. This manual contains all the instructions you need. For now, disregard the owner's guide that came with your Macintosh II or Macintosh IIx. You need to do the following to set up your hardware:

- ☐ Lay out the basic system.
- ☐ Install the video card and monitor.
- ☐ Attach the keyboard and mouse.
- ☐ Install the programmer's switch.
- ☐ Connect all external devices.
- ☐ Connect all cables and power cords.

If all of your equipment is already set up, go on to Chapter 2, "Starting Up Your System."

If your computer is already set up, but you are configuring A/UX from a *factory-installed* external hard disk, skip to the section "Adding SCSI Devices."

If your computer is already set up, but you need to attach the *Apple Tape Backup 40SC* or a *new external hard disk*, skip to the section "Adding SCSI Devices."

Laying out the basic system

In this section, you will identify and lay out the parts of your Macintosh II or Macintosh IIx computer system. This section also presents safety information and practical points about setting up your work environment.

1. Take all the materials out of the packing boxes and check whether you have everything shown in Figure 1-1.

Check your packing lists to make sure you have everything. Then fill out the registration card for each component and mail the cards. (The registration card asks for serial numbers; you'll find each serial number either on the bottom or on the back of each part.) In the unlikely event that something is missing, call your authorized Apple dealer immediately.

❖ *Save the packing material:* Store the boxes and all the packing material. You should use the boxes and this material to repack your computer system if you have to move it over long distances (any move that requires a car or an airplane).

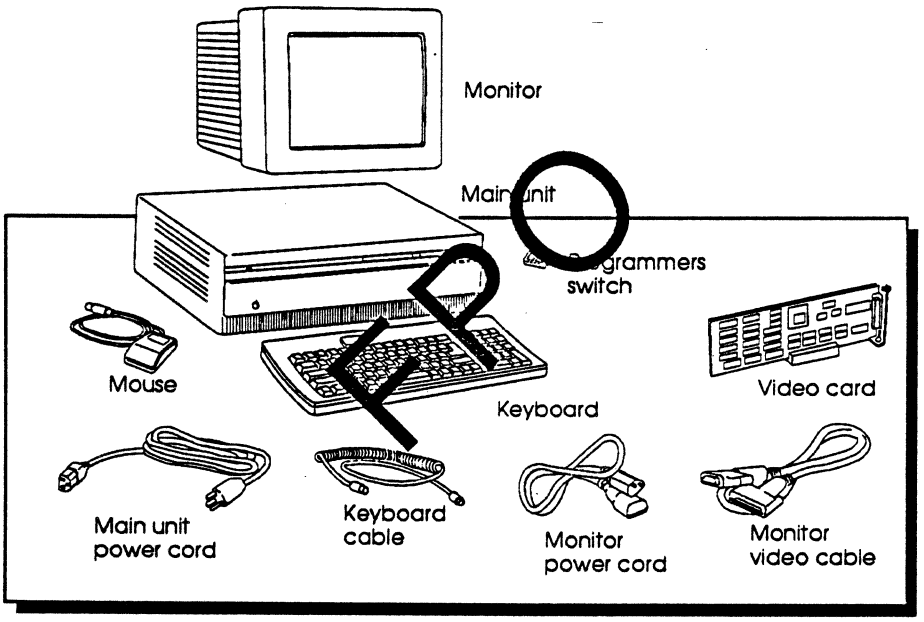

Figure 1-1
What you should have

2. Choose a good place to set up your system.

Don't use card tables or anything with a surface that could be tipped or knocked over. To avoid glare on the screen, pick a place where light won't reflect into your eyes and where you won't be facing bright light.

Your computer needs to be plugged into a three-hole grounded outlet. If you have more than two devices that need to be plugged into wall outlets, you should get a grounding power strip. Available at any electronics or hardware store, a power strip is like a wall socket with four to eight outlets; many of these power strips come with a surge protector and an on/off switch for convenience.

3. Familiarize yourself with the back of the system.

Turn the main unit so that you're looking at the back of it. Figure 1-2 identifies the ports, connectors, and switches that you use as you set up your Macintosh II or Macintosh IIx.

Various symbols or icons identify the different ports. You will use the ports to attach cables between your computer and other hardware.

Also on the back of the main unit is the power switch. Use this switch only in exceptional cases; it is not intended for regular use. In the normal course of events, you turn on the computer by pressing the POWER ON key.

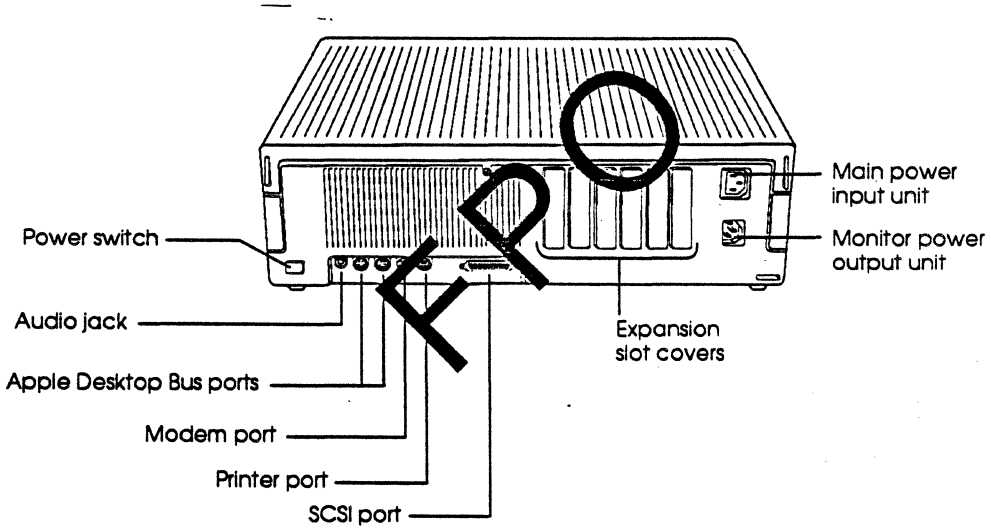

Figure 1-2
The back of the main unit

FPO

4. Read this safety information.

You're almost ready to plug in your Macintosh II or Macintosh IIx, but first read this important safety information.

Warning

This equipment is intended to be electrically grounded. Your computer is equipped with a three-wire grounding plug — a plug that has a third (grounding) pin. This plug will fit only a grounding-type AC outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded plug. Do not defeat the purpose of the grounding plug!

For your own safety and the safety of your equipment, always take the following precautions.

Disconnect the power plug (by pulling on the plug, not the cord) under these circumstances:

- if the power cord or plug is frayed or otherwise damaged
- if anything is spilled into the case
- if your equipment is exposed to rain or any other excess moisture
- if the case has been dropped or if it has been otherwise damaged
- if you suspect that your computer needs servicing or repair
- whenever you clean the case

Be sure that you always do the following:

- Keep all air vents clear. Leave 4 to 6 inches of clearance between the vents on both sides of the main unit and any object that may restrict air flow. If you place your monitor on top of the main unit, it should not lie "flat"; make sure it sits at least 8 mm (0.314 inches) above the surface of the main unit. (Apple monitors come with little rubber "feet" to raise them the correct distance, allowing for air to circulate properly.)
- Keep your equipment away from any source of liquid (such as wash basins, bathtubs, and shower stalls). If you drink any beverages while at your computer, take care not to spill them.
- Keep your equipment protected from damp or wet weather.
- Read all the installation instructions carefully before you plug the product into a wall socket.
- Keep these instructions handy for reference.
- Follow all instructions and warnings dealing with your system.

Warning

Electrical equipment may be hazardous if misused. Operation of this product or similar products must always be supervised by an adult. Do not allow children access to the interior of any electrical product, and do not permit them to handle cables.

When you wish to clean the case:

- ☐ Disconnect the power plug by pulling on the plug, not the cord.
- ☐ Wipe the case with a clean, soft cloth moistened with water.
- ☐ Wipe the surfaces lightly, but do not wipe the monitor screen. For cleaning the screen, use only the special cloth provided and do not moisten it.

5. Connect the socket end of the power cord to the main power input, which is the bottom receptacle on the right side of the main unit, when viewed from the rear.

❖ *Note:* The connector above the main power input is for the monitor power output.

6. Plug the other end of the power cord into a three-hole grounded outlet.

Warning

Do not turn on the computer system until you've completed the entire hardware installation process. Turning on the system at the wrong time could result in electrical shock to you or cause damage to your computer system's components.

The plugged-in power cord acts as a ground for the system, protecting its components from static electrical discharge. With your power cord plugged in, but with the power still off, you are now ready to install your video card and monitor.

Installing your video card and monitor

Apple Computer provides both color and monochrome monitors for the Macintosh II and Macintosh IIx. The basic installation process is the same for all monitors. You connect the monitor to your computer through the socket on a video card installed in an expansion slot in the computer's main unit. You must complete these processes:

- ☐ Install the video card in the main unit.
- ☐ Connect the monitor's video cable.
- ☐ Connect the monitor's power cord.

Installing the video card

Follow these steps to install the video card:

1. Remove the lid from the computer's main unit.

Figure 1-3 shows the correct way to remove the lid.

Using a Phillips screwdriver, loosen and remove the security screw holding the lid to the main unit. (It's at the top center of the rear panel.) Wrap your hands around the rear corners of the case.

Press the latches as you lift up on the back of the lid.

When you feel the front of the lid release, rotate the lid until it disengages from the hooks on the main case.

Lift the lid all the way off the case and put it aside. Use caution in handling the lid since metal strips on the inside edges can be sharp. Also be careful when you set the lid aside because the metal tabs are easily bent, and you may have difficulty in reinstalling the lid later.

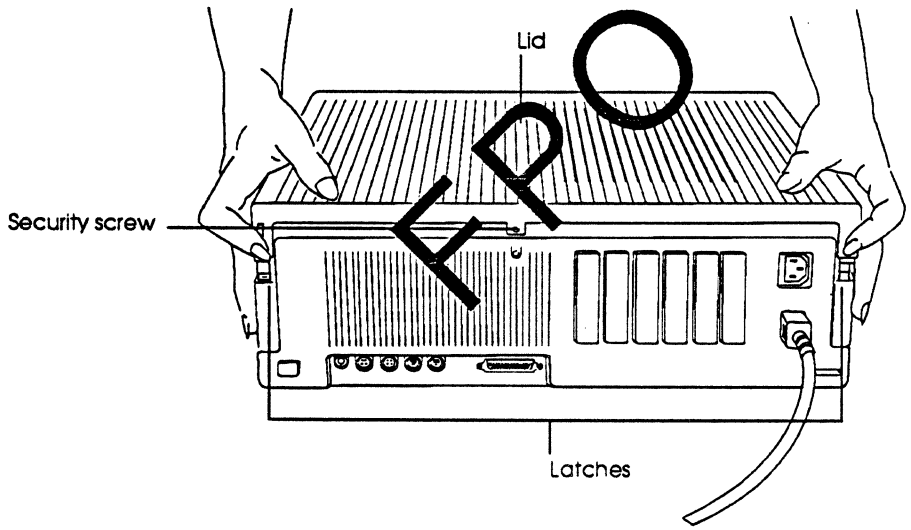

Figure 1-3
Removing the lid

2. Touch the power supply case inside the computer to discharge any static electricity that might be on your clothes or body, as shown in Figure 1-4.

Warning

It's OK to touch the power supply if you've just unpacked the computer. However, in normal use the power supply gets quite hot. For future use, it's good to remember that if you need to do work inside the computer, and the computer has been on, shut it off and wait at least five minutes before touching the power supply.

---

3. Choose the expansion slot you want to use.

As Figure 1-5 shows, the expansion slots are the narrow plastic receptacles located at the bottom of the main unit, near the back. It doesn't matter which one you use.

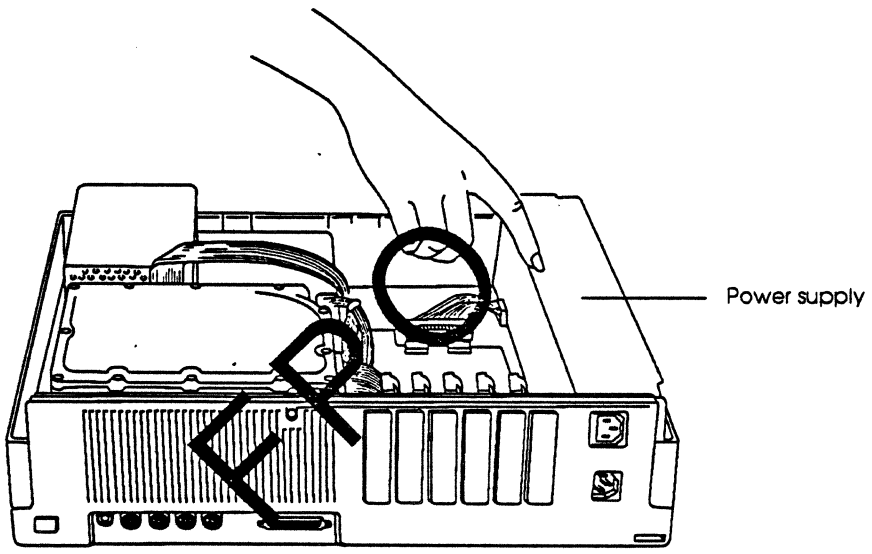

Figure 1-4
Touching the power supply case

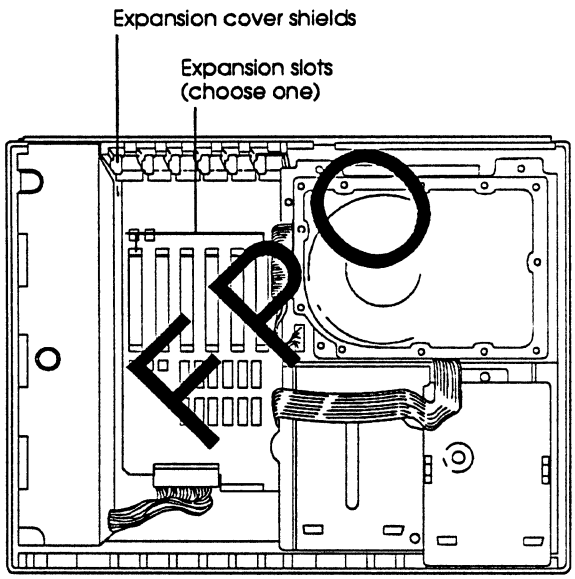

Figure 1-5
The expansion slots and the expansion cover shields

4. Remove the expansion cover shield by lifting it up until the shield is free of the guide and pin.

Save the shield; you will need it later if you take the card out of the slot. The card itself has a shield attached to it that replaces the shield you just removed. Figure 1-6 shows a diagram of the expansion slot.

5. Push out the plastic hole cover that lines up with the slot.

Use a screwdriver or other strong implement to push out the hole cover. Set the cover aside. You can grasp the cover with your thumb inside the computer and your fingers outside and push the cover out with your thumb, but be very careful when doing this.

Figure 1-7 shows one way to remove the cover.

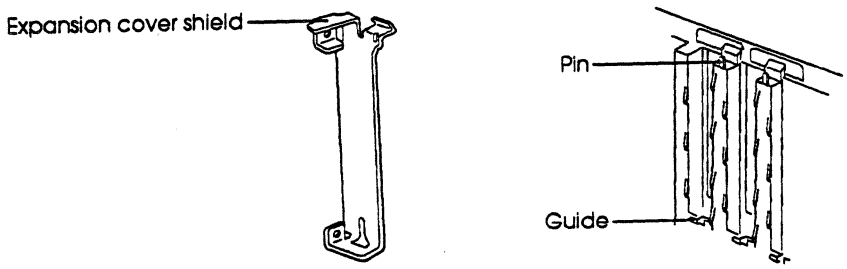

Figure 1-6
Expansion slot

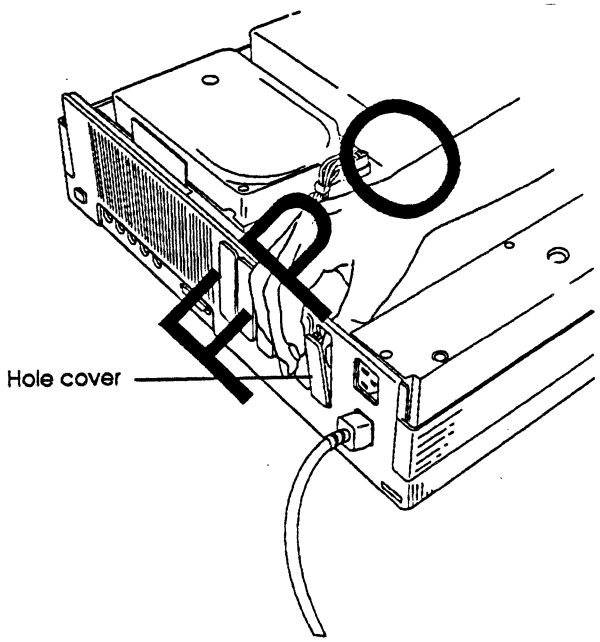

Figure 1-7
Removing the expansion slot cover

6. Insert the video card into the expansion slot.

- ☐ Pick up the video card by the top of the metal bracket and the top of the card's other end. (Be careful not to touch the pins on the bottom edge of the card.)
- ☐ The expansion cover shield on the card attaches to the inside of the back panel in the same way as the shield you just removed. Align the card so that the guide fits through the lower slot in the shield on the card and the pin sticks up slightly through the hole at the top of the shield.
- ☐ Align the connector on the bottom of the card directly over the slot.
- ☐ Place one hand along the top edge of the card, directly over the connector area; push down firmly on the card until the connector is fully seated.

Important

Don't force the card. If you meet a lot of resistance, pull the card out and try again. Don't wiggle the card from side to side when you insert it. Wiggling the card puts unnecessary stress on the card and slot.

Figure 1-8 shows how to align the video card.

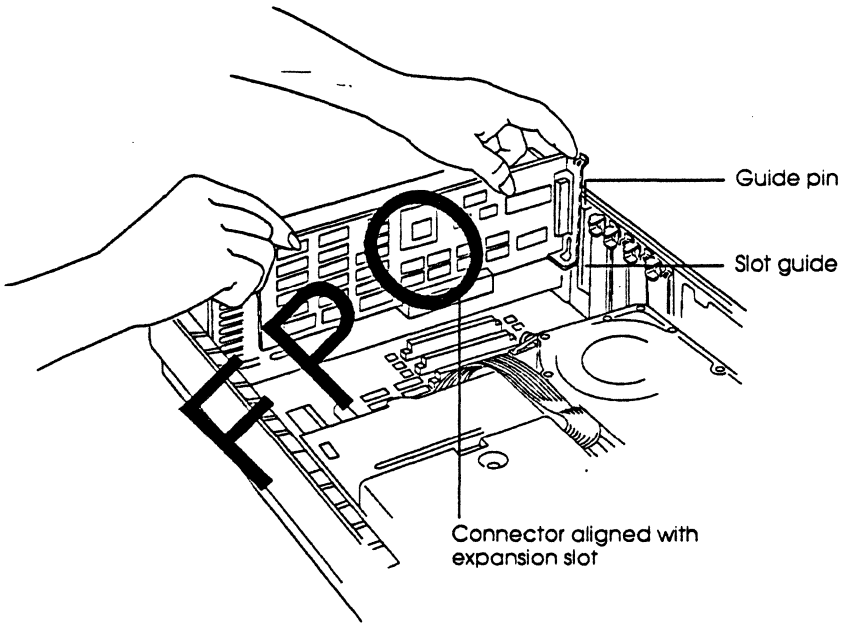

Figure 1-8
Aligning the video card

You can test whether the card is properly connected by lifting it gently. If it resists and stays in place, it's connected.

You can repeat steps 1 through 6 to install all expansion cards in your Macintosh II or Macintosh IIx at any time. If the computer has been running, let it cool down for five minutes before you open up the main unit. Of course you should also read and follow any instructions that come with other expansion cards you may have.

Figure 1-9 shows the video card correctly inserted into the Macintosh.

Important

If you plan to install more than one card, see the owner's guide that came with your computer for details on the power available for the expansion slots.

---

7. Replace the lid on the main unit.

- ☐ Tip the front of the lid down so it catches the three hooks under the lid in the front of the main unit's case.
- ☐ Lower the back of the lid onto the case and press firmly on the back corners until you hear the rear latches snap into place.
- ☐ Replace and tighten the security screw.

Figure 1-10 shows how to replace the lid.

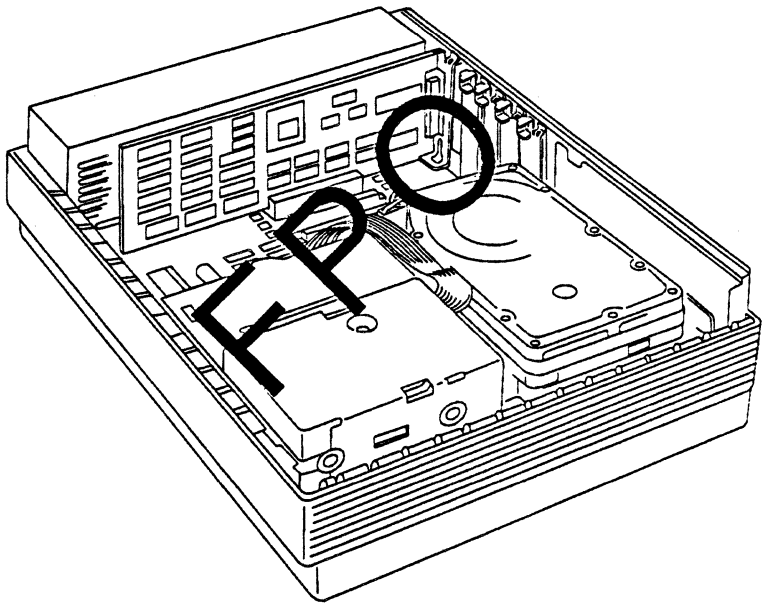

Figure 1-9
The inserted card

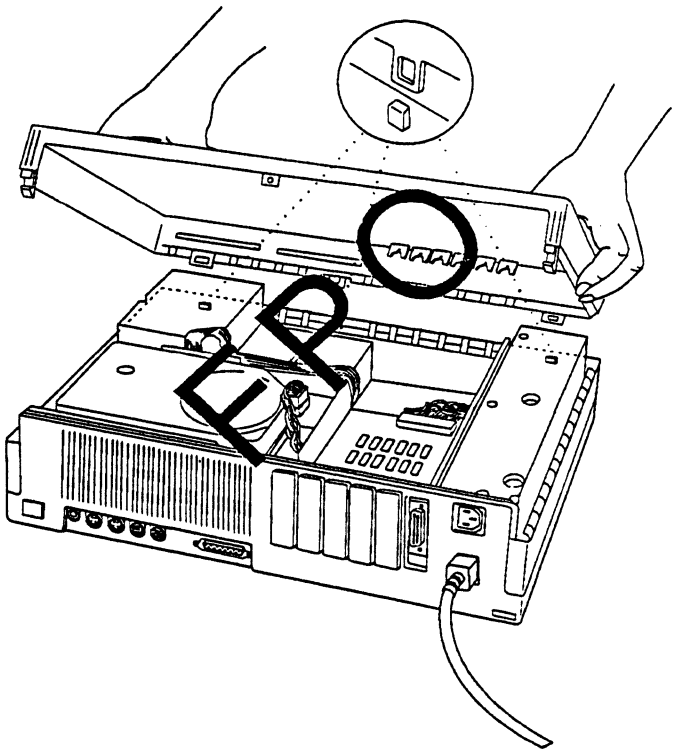

Figure 1-10
Replacing the lid

Warning

When reinstalling the lid, ensure that it is properly seated before turning on the power. To check, press firmly down at the two rear latch positions and the three front latch positions.

Connecting the video cable

With the back of the main unit still facing you, place your monitor near the main unit. Turn the monitor so its back panel is facing you. Then follow these steps to connect the video cable:

1. Plug one end of the video cable (both ends are the same) into the video socket on the back of the monitor.

The socket is marked with a video icon, as shown in Figure 1-11.

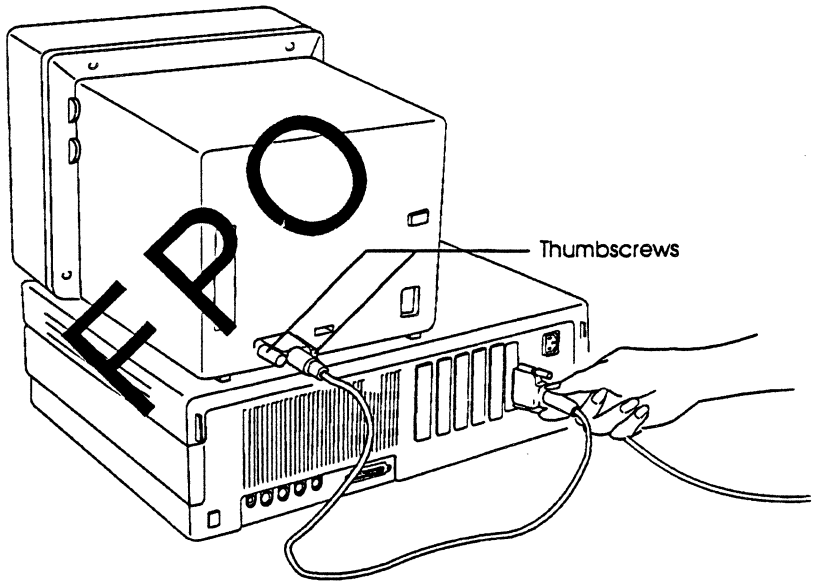

Figure 1-11
Connecting the video cable

2. Tighten the thumbscrews on the connector.

A tight connection prevents the cable from coming loose and prevents radio and television interference.

3. Connect the other end of the video cable to the socket on the video card through the opening in the rear of the computer, and tighten the thumbscrews.

Warning
The plug for your Apple monitor is identical to a thick Ethernet® cable plug. If you later install an Apple EtherTalk™ card, be sure that you do not plug the video cable into the socket on the EtherTalk card, and that you do not plug an Ethernet cable into the socket on the video card. Either action can damage your card.

You can identify the EtherTalk card while facing the back of the main unit by examining the round connector (used for thin Ethernet), which is just below the socket for the regular Ethernet cable.

Connecting the monitor power cord

Follow these steps to connect the monitor power cord.

1. **Plug the socket end of the power cord into the monitor power input unit on the back of the monitor.**

   The plug is marked with a power icon. Figure 1-12 shows how to connect the monitor power cord. Notice that the monitor power input receptacle has three prongs.

2. **Connect the other end of the power cord to the monitor power output receptacle on the back of the main unit.**

   The monitor power input unit is on the right side of the main unit, just above the main power input receptacle.

   For information about adjusting brightness and contrast (and alignment, if you have a color monitor), see the manual that came with your monitor. Don't adjust any settings yet; wait until you've attached the keyboard and the mouse.

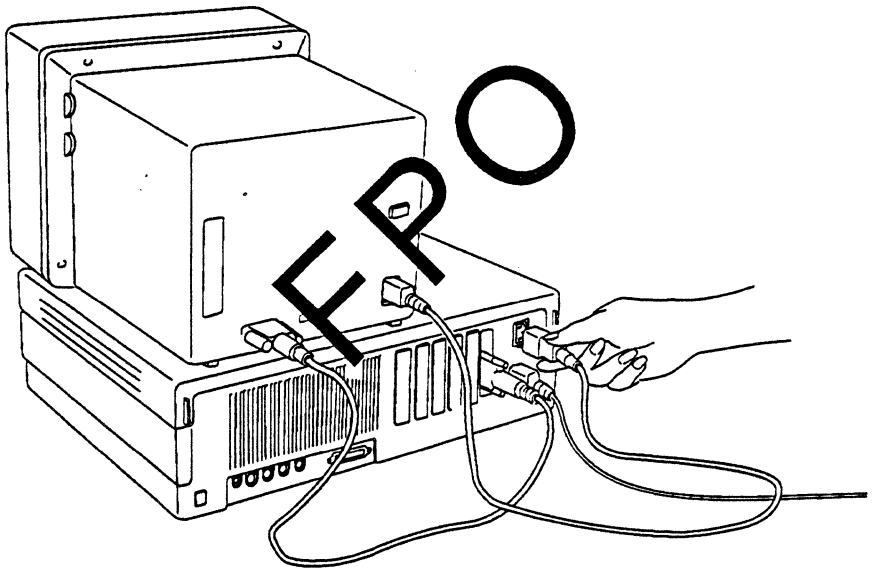

Figure 1-12
Connecting the monitor power cord

Attaching the programmer's switch

The programmer's switch is for people using A/UX to develop applications. Installing it and using it the wrong way can cause you to lose information. Only use the programmer's switch when you have no other way to restart or reset the system.

The programmer's switch has two parts. The front part of the switch is a reset switch. Pressing it is just like turning the power switch off and back on, and carries the same cautions — press it only with all disks properly ejected. The back part of the switch is an interrupt switch; press it only if you have debugging software installed.

The switch snaps into place on the right side of the Macintosh II or Macintosh IIx. Follow these steps to install the programmer's switch:

1. **Align the switch so that the rightmost pin on the switch fits in the last air vent on the right side of the main unit.**

2. **Tip the switch and insert the top pair of pins with the hooks facing up.**

3. **Push up and in on the bottom of the switch. The switch should snap into place.**

   Figure 1-13 shows the correct placement of the switch.

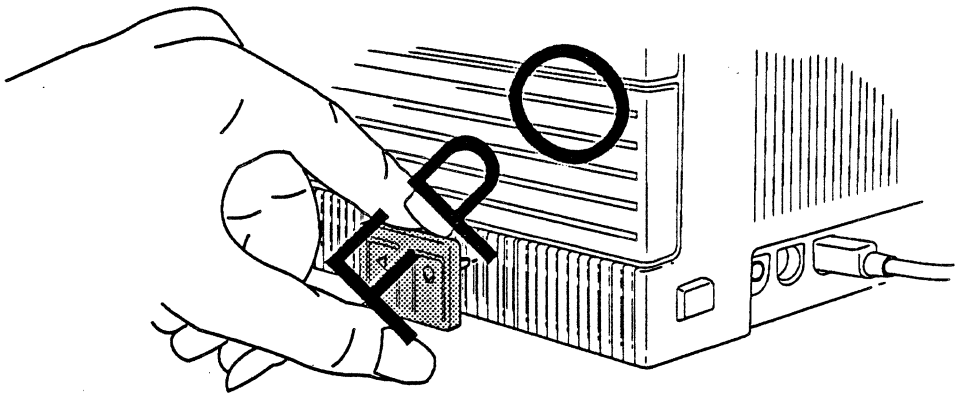

Figure 1-13
Installing the programmer's switch

Attaching the keyboard and the mouse

There are several ways to connect the mouse and the keyboard. The following steps show how to connect the mouse to the keyboard and how to connect the keyboard to the main unit. When you've completed this procedure, you'll find information on alternative ways to connect these devices.

Important

The steps are presented in the following order so that the last step you do is connect the keyboard to a power source. Once the keyboard has power, accidentally pressing the POWER ON key will turn your computer on before it's appropriate to do so.

Your Macintosh II or Macintosh IIx works with a variety of keyboards. Although they may look different, you attach them to the keyboard in the same way. Place your keyboard near the back of the main unit and facing you. Then follow these steps:

1. **Plug the mouse cable into the port on the right side of the keyboard, as shown in Figure 1-14.**

❖ *If you're left-handed:* Plug the mouse cable into the connector on the left side instead.

To plug the mouse cable into the keyboard, turn the flat part of the cable connector away so that it faces the rear of the keyboard, and then insert it into the keyboard connector.

This kind of arrangement is known as a daisy chain. (In effect, the mouse is connected to the computer through the keyboard.)

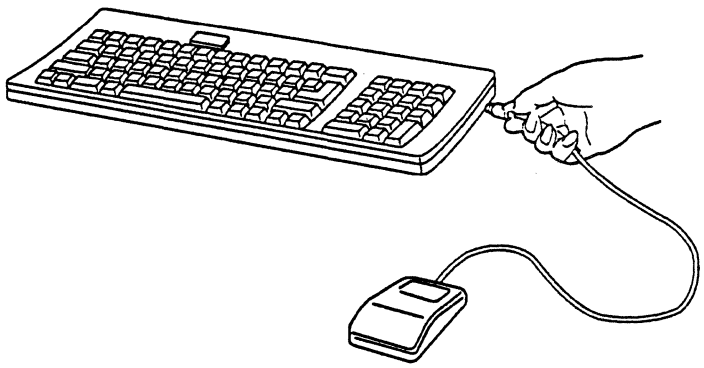

Figure 1-14
Connecting the mouse

2. Plug one end of the keyboard cable into the other port on the keyboard.

Figure 1-15 shows the keyboard cable and the keyboard.

3. Plug the other end of the keyboard cable into either of the two Apple Desktop Bus™ ports on the left side of the back panel on the main unit.

The Apple Desktop Bus (ADB) is so named because several different devices (the keyboard, the mouse, and other ADB devices, such as a graphics tablet, a joystick, or another keyboard) can send information along one "bus line" to the computer. Your Macintosh has two ADB ports.

Figure 1-16 shows how to connect the cable to the computer.

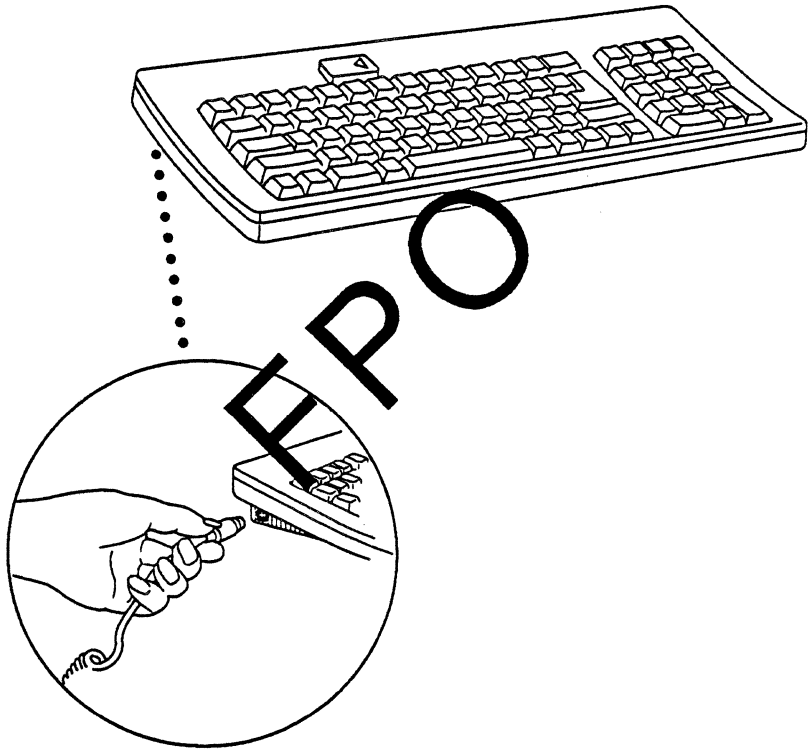

Figure 1-15
Connecting the cable to the keyboard

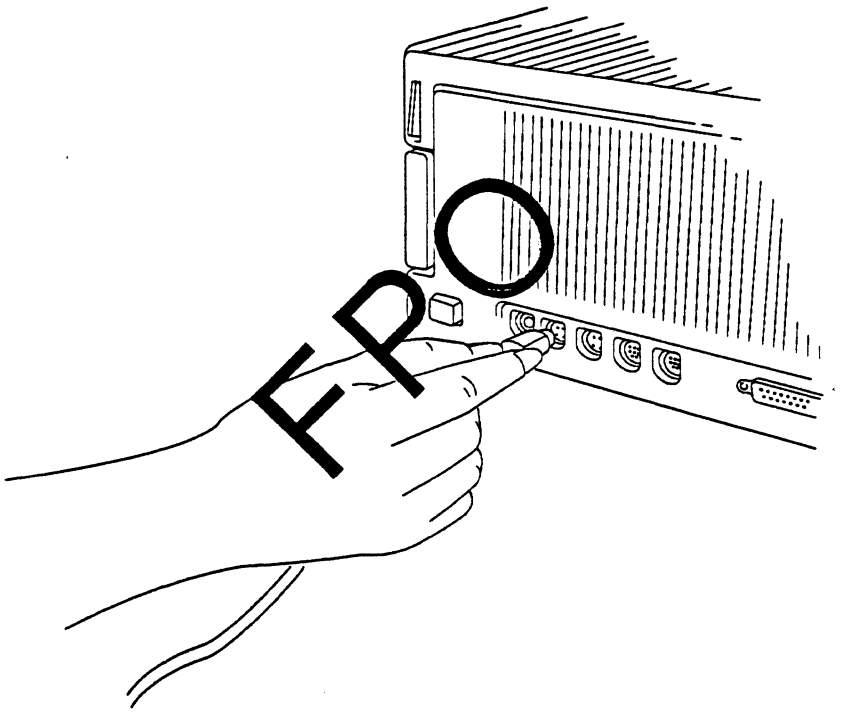

Figure 1-16
Connecting the keyboard to the main unit

You might prefer to plug the mouse into the other connector on the back of the Macintosh II or Macintosh IIx, leaving the second connector on the keyboard free for now. Figure 1-17 shows different ways to connect the mouse and the keyboard to an ADB connector.

If you have other Apple Desktop Bus devices to attach to your system, you can either daisy-chain them to the keyboard or use one of the ports on the computer's back panel.

4. Arrange your components so that you can work comfortably.

Turn the main unit so that it's facing you. Place the monitor where you want it (on top of the main unit is fine), and position the keyboard and mouse where you can reach them comfortably.

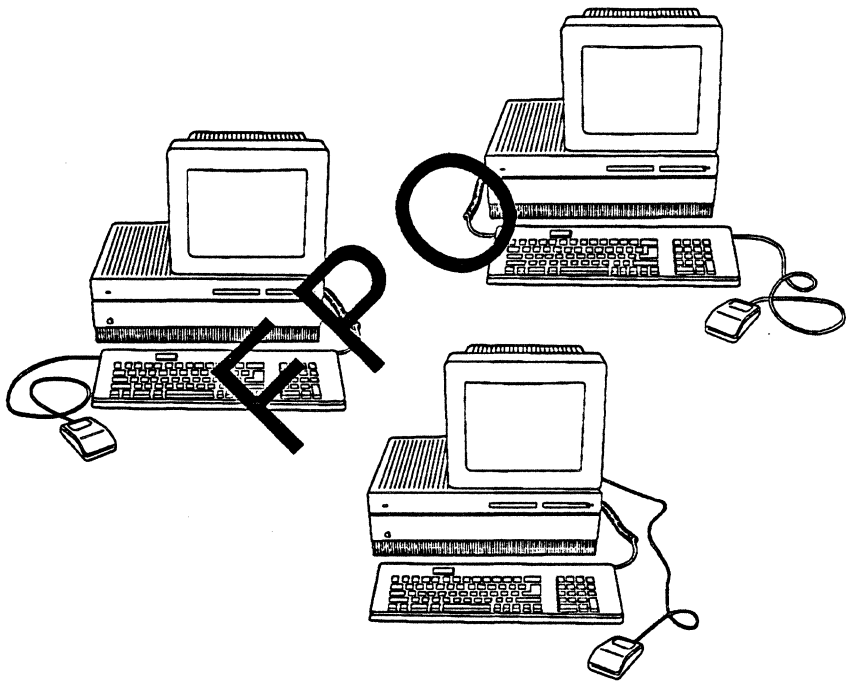

Figure 1-17
Alternative configurations

Note that if you place your monitor on top of the main unit, it should sit at least 8 mm (0.314 inches) above the surface to let air circulate properly. Apple monitors come with small rubber "feet" to raise them to the correct height.

Warning

Protect your system from overheating by keeping 4 to 6 inches clear around all sides of your computer's main unit, as shown in Figure 1-18. Always keep the computer's main unit flat, sitting on its rubber feet. Standing it on edge or not allowing room for air to circulate defeats the cooling design and may eventually damage the main unit.

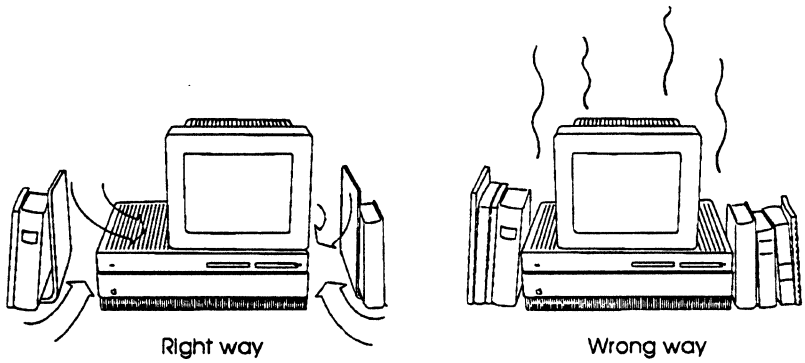

Figure 1-18
Allowing room for air to circulate

If you have A/UX *factory-installed* on an *internal* hard disk, your Apple representative should have already installed it for you. You are almost ready to start up A/UX. Go to Chapter 2, "Starting Up Your System."

If you purchased A/UX *factory-installed* on an *external* hard disk or if you are installing A/UX to an *external hard disk* using the *A/UX Tape Product* or *A/UX Floppy Product,* you must connect the hard disk or tape backup device to your system before proceeding any further. Go to the next section "Adding SCSI Devices," for instructions on connecting external hard disks and tape backup devices.

Adding SCSI Devices

This section describes how to attach SCSI (Small Computer System Interface) devices such as an Apple Hard Disk SC or Apple Tape Backup 40SC to a Macintosh II or Macintosh IIx computer. It contains the latest information on connecting Apple SCSI devices.

Before you lay out and connect your equipment, read the sections on general rules and SCSI ID numbers to find out important information. Then choose the section that describes your system to arrange and connect your SCSI device or devices.

For more information on the Tape Backup 40SC or the Hard Disk 80SC, see the owner's guide that came with the device.

Figure 1-19 shows the cables and Cable Terminator that you may use to connect your SCSI chain. You need one cable per device. You use the System Cable to attach a SCSI device to the computer. You use the Peripheral Interface Cable to connect SCSI devices to each other. You use the Cable Extender to add distance between devices.

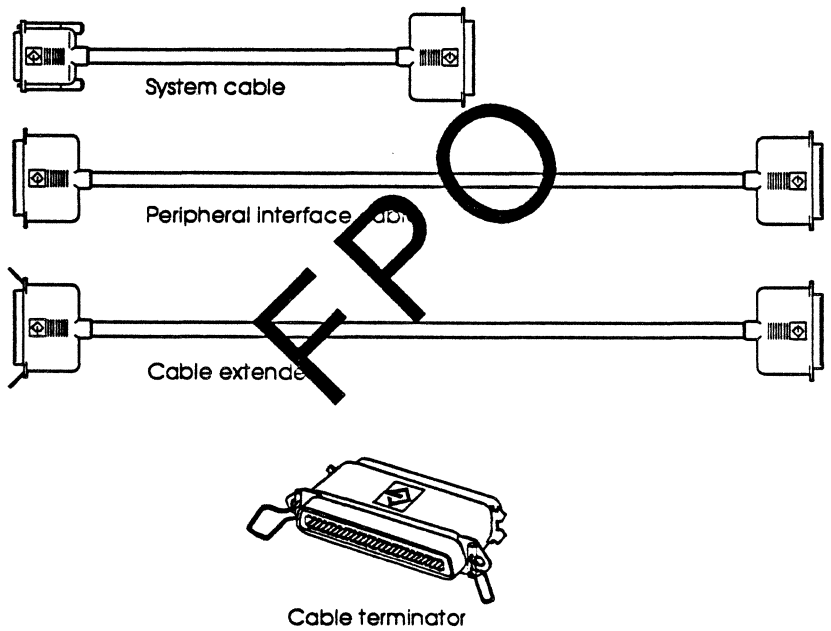

Figure 1-19
Apple SCSI Cable System

General Rules

To connect SCSI devices correctly, there are some rules you must follow. Review the following SCSI dos and don'ts.

SCSI dos

- **Always use an Apple SCSI System Cable to start connecting a SCSI chain.**
- **Always end a SCSI chain with a terminator.**
  The terminator can be built into a device or attached to the last available SCSI port.
- **Attach only the Apple SCSI System Cable to the SCSI port on your computer.**
  Connecting other cables to this port can seriously damage the SCSI chip or your computer.
- **Match the SCSI icon (see Figure 1-20) on the SCSI cable connectors and the SCSI ports to correctly connect SCSI devices.**

Figure 1-20
The SCSI icon

SCSI don'ts

- **Don't use more than two terminators in the SCSI chain.**
  More than two terminators can damage your computer, the SCSI chip in your computer, or external storage devices such as hard disks.
- **Don't use more than 20 feet (6.5 meters) of cable to connect your SCSI devices.**
- **Don't attach more than seven SCSI devices to your computer.**
  The Apple SCSI cable system supports a maximum of eight SCSI devices. On a Macintosh system, the computer itself counts as one device. If the system contains an internal hard disk, the hard disk also counts as a SCSI device. For example, you could connect a maximum of six external devices to a Macintosh with an internal hard disk.
- **Don't crimp the cables when you set up and connect your SCSI chain.**
  Sometimes crimping the cables can cause physical damage to the cables or devices.

- **Don't place SCSI devices on the left side of the Macintosh II or Macintosh IIx.**
  You risk magnetic interference from the computer's power supply if you place devices in this location. You can place SCSI devices anywhere else it's convenient for you to use them.
- **Don't connect two Macintosh computers to one hard disk using the Apple SCSI cable system.**
  The computers will appear to function properly at first, but they will confuse directories in the hard disk and certainly cause data loss and confusion between computers.

Figures 1-21 and 1-22 show how to organize your devices. Notice the placement of terminators, with one at *the beginning* of the SCSI chain and one at *the end* of the chain. These systems include

- Apple SCSI peripheral devices
- Apple SCSI peripheral devices and non-Apple SCSI peripheral devices

If you have more peripheral devices than shown, place them in the middle of the chain.

Important

You can have only two terminators in the SCSI chain. Have your authorized Apple dealer or representative or the product manufacturer remove any extra internal terminating resistors. (Your peripheral device manual should tell you whether the device contains internal terminating resistors.)

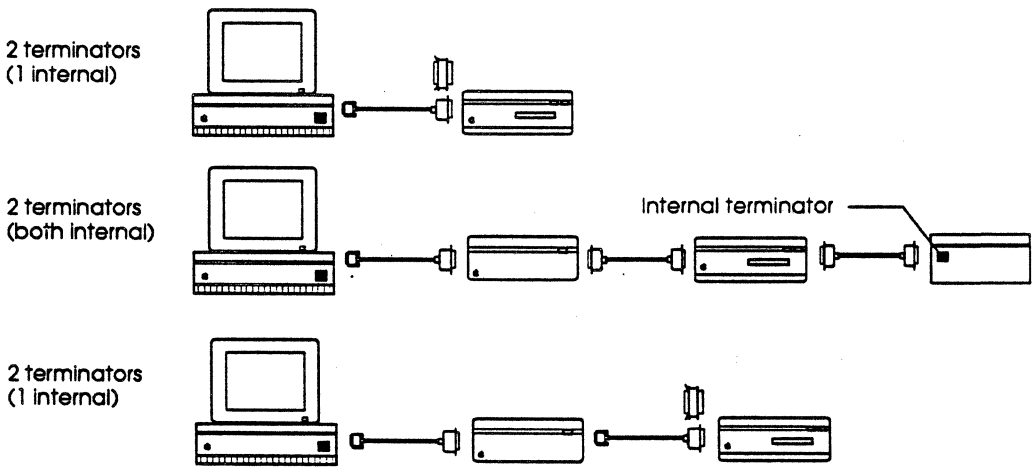

Figure 1-21
Macintosh II and Macintosh IIx computers (*with* internal hard disks) and external SCSI devices

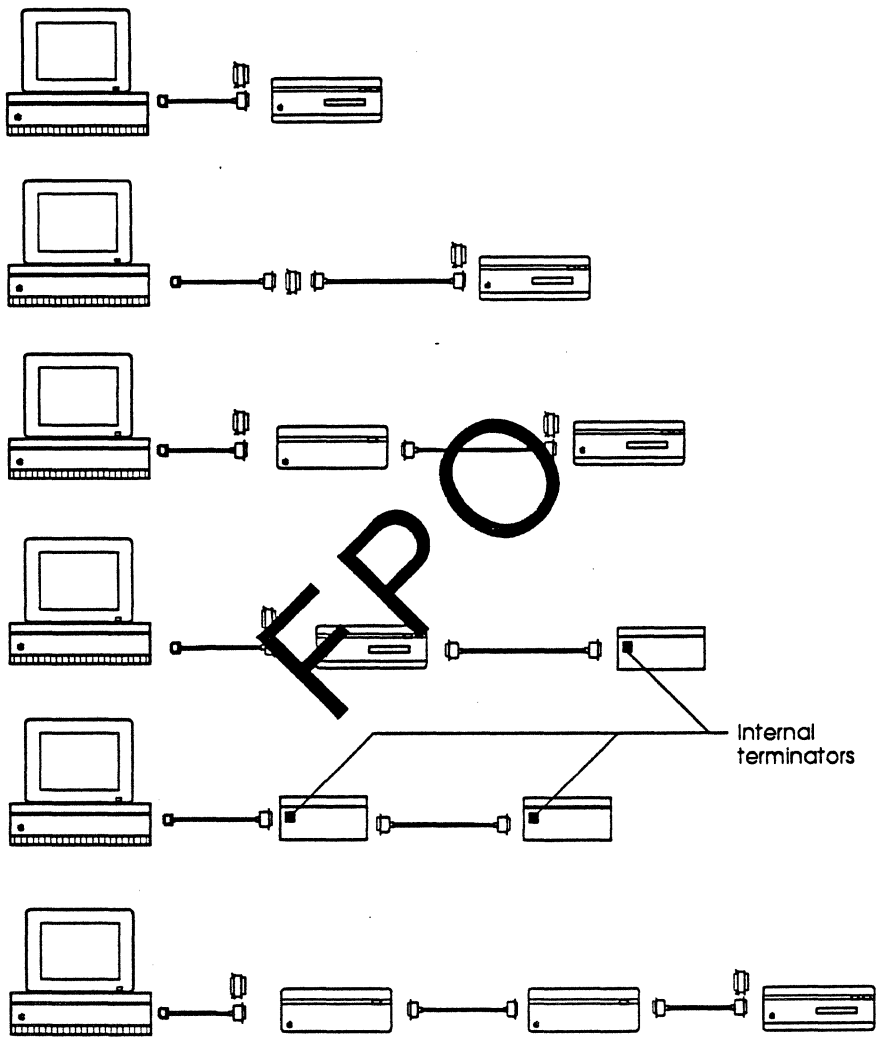

Figure 1-22
Macintosh II and Macintosh IIx computers (*without* internal hard disks) and external SCSI devices

Setting the SCSI ID number

Each device in your SCSI chain must have a unique ID number. This section explains about SCSI ID and tells how to set the ID number on Apple devices. For information on other SCSI devices, see the manual that came with the device.

About SCSI ID

In order to establish a communication path among devices, the SCSI bus controller uses ID numbers to distinguish and identify the devices. The SCSI ID number identifies each device like your name identifies you. You don't have to connect devices in numerical order.

For example, if you have two hard disks and a tape backup device, each hard disk and the tape backup device must have a different ID number. Figure 1-23 shows an example of a SCSI chain where each device has a unique identity (SCSI ID number).

Eight numbers (corresponding to the possible number of devices) — 7 through 0 — are used to establish identity and priority on the SCSI bus.

Apple SCSI peripheral devices are shipped with assigned SCSI ID numbers. Your Macintosh is always assigned the ID number 7. If you have an Apple internal hard disk, it is set to ID number 0. (With a Macintosh II or Macintosh IIx, you can override the normal startup sequence by using the Control Panel desk accessory to select a preferred startup device.) External hard disks come set to ID number 5. Tape Backup 40SC devices come set to ID number 1. You can use the other numbers to assign unique identities to additional SCSI devices.

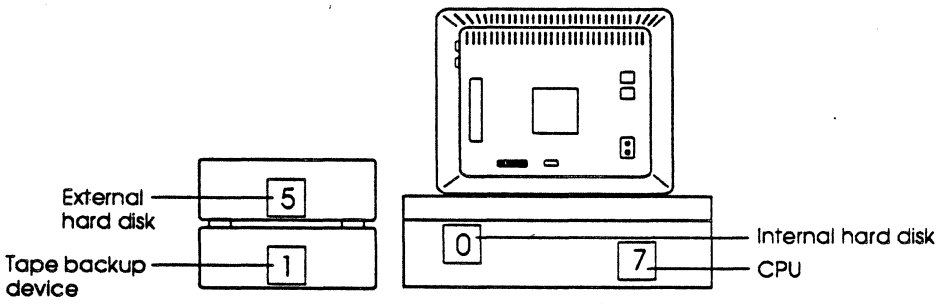

Figure 1-23
SCSI chain ID

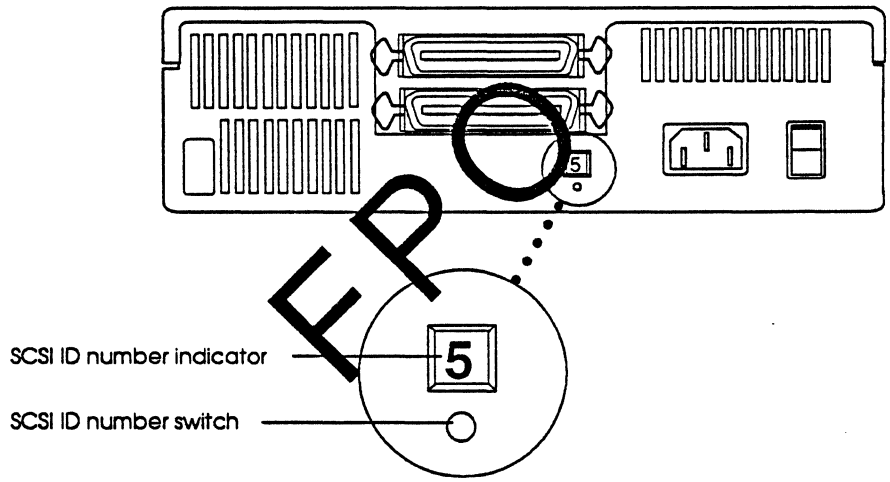

Figure 1-24
The SCSI ID number indicator and switch for Apple peripheral devices

Figure 1-24 shows the SCSI ID number indicator and switch found on the back panel of external devices.

Changing the SCSI ID number

You must change the ID number of any device that has the same number as another device in the chain. Changing ID numbers is more difficult if the cables are attached, so do it before connecting devices.

Follow these steps if you need to assign a different SCSI ID number to a device:

1. **Make sure the device is turned off.**

2. **Choose an unassigned SCSI ID number.**

3. **Insert the point of a push pin or straightened paper clip into the SCSI ID number switch. (See Figure 1-24.)**

4. **Push gently to increase the number.**

5. **If you go past the number you want, keep pushing until the number cycles around to your choice.**

Connecting one external device

If you are connecting only one external device to your system, read this section. If you are connecting more than one external device, go on to the next section, "Connecting Multiple External Devices." If you are connecting an additional SCSI device to an existing SCSI chain, see the section, "Adding a SCSI Device to an Existing SCSI Chain."

When you connect one external device to a Macintosh with a System Cable, you attach a Cable Terminator to the available SCSI port on the SCSI device. If you are connecting to a Macintosh without an internal hard disk and you add a Cable Extender, you need to follow the instructions in this section, and add a Cable Terminator between the System Cable and the Cable Extender. For more information see Figure 1-21, Macintosh II and Macintosh IIx computers (*with* internal hard disks) and external SCSI devices, and Figure 1-22, Macintosh II and Macintosh IIx computers (*without* internal hard disks).

Follow these steps to connect your system:

1. Make sure your computer is plugged in and turned off.

2. Touch any one of the metal connectors on the back of your computer.

Doing this discharges any static electricity that may be on your body or clothes.

Warning

Attach only the SCSI System Cable 25-pin connector to the SCSI port on the computer.

Look for the SCSI icon on the back panel of the computer to identify the port.

Putting another type of cable connector in the SCSI port can seriously damage the SCSI circuit inside your computer or the computer itself.

---

3. Attach the 25-pin connector of the System Cable to the SCSI port on your computer. (See Figure 1-25.)

4. Tighten the thumbscrews on the 25-pin connector.

If you're using Cable Extenders, attach the Cable Terminator between the System Cable and the Cable Extender and snap the clips into the clip brackets. Then go on to step 5.

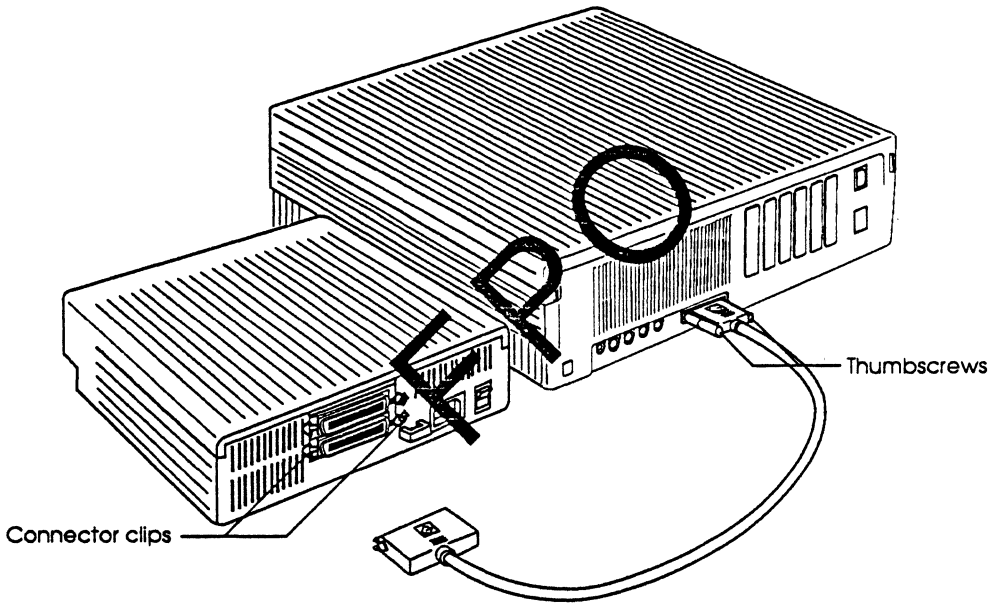

Figure 1-25
Attaching the System Cable to the Macintosh II or Macintosh IIx SCSI port

5. Attach the 50-pin connector on the System Cable or Cable Extender to a SCSI port on the back of the external SCSI device. (See Figure 1-26.)

Press the diamond-shaped wire clips toward the connector, snapping them into the clip brackets to secure the connection.

6. Attach the Cable Terminator to the available SCSI port on the back of the peripheral device. (See Figure 1-27.)

Snap the clips into the clip brackets to secure the connection.

❖ *Note:* If the external SCSI device you're attaching has internal terminating resistors, don't attach the Cable Terminator. Skip to step 7.

7. With the peripheral device attached to your computer system and *switched off*, attach the peripheral device power cord and plug it into a grounded (three-prong) AC outlet.

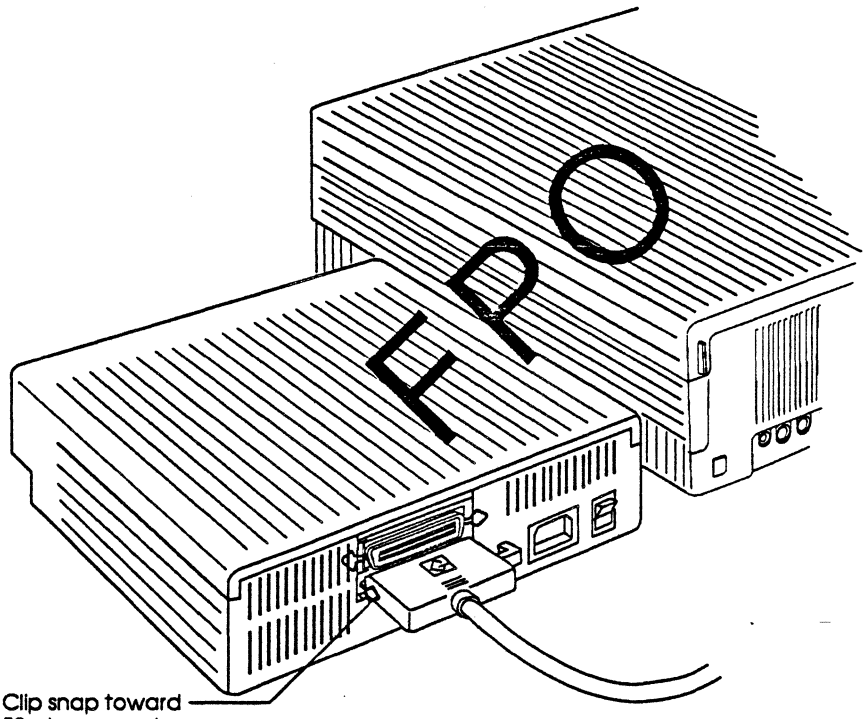

Figure 1-26
Attaching the System Cable to an external device

Warning: This equipment is intended to be electrically grounded.

Apple computers and peripheral devices are equipped with three-wire grounding plugs — plugs that have a third (grounding) pin. These plugs will fit only grounding-type AC outlets. This is a safety feature.

If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet.

Do not defeat the purpose of the grounding plug!

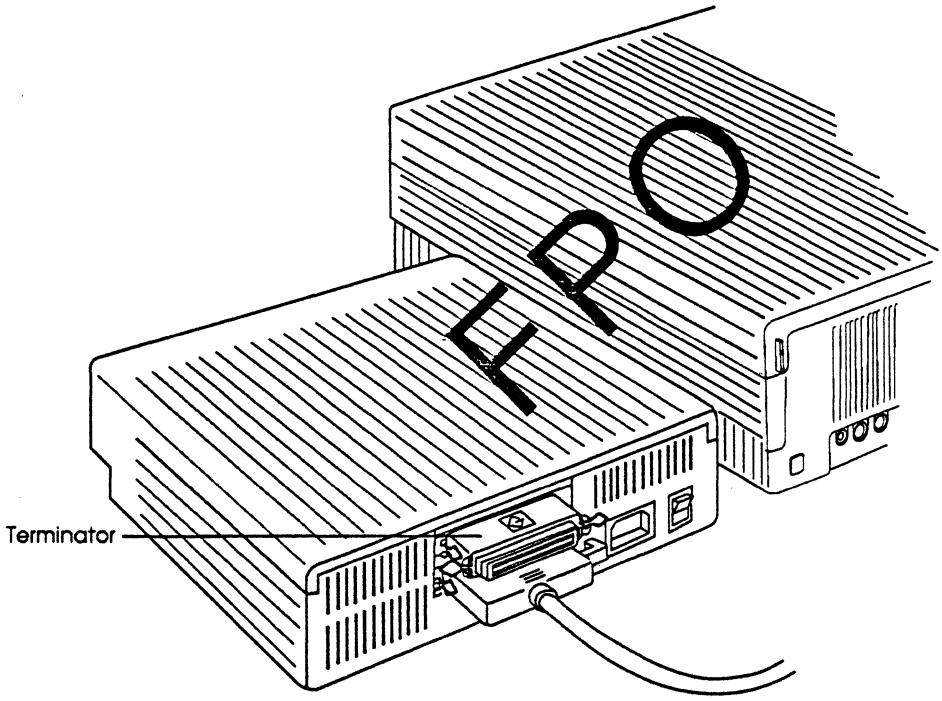

Figure 1-27
Attaching the Cable Terminator to an external SCSI device

Go to Chapter 2, "Starting Up Your System."

Connecting multiple external devices

When you connect multiple external devices, the number of cables and terminators you need depends on the type of Macintosh II or Macintosh IIx you have and the number of devices you're connecting.

You need a System Cable to connect the first device. You also need one Peripheral Interface Cable for each subsequent device. If your Macintosh has an internal hard disk, you need only one Cable Terminator. If your Macintosh does not have an internal hard disk, you need two Cable Terminators. Choose the section for the type of computer you're using.

Connecting to a Macintosh II or Macintosh IIx *with* an internal hard disk

Follow these steps to connect your system:

1. **Make sure your computer is plugged in and turned off.**
2. **Touch any of the metal connectors on the back of your computer.**

   Doing this discharges any static electricity that may be on your body or clothes.

Warning

Attach only the SCSI cable system 25-pin connector to the SCSI port on the computer.

Look for the SCSI icon on the back panel of the computer to identify the port.

Putting another type of cable connector in the SCSI port can seriously damage the SCSI circuit inside your computer or the computer itself.

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3. **Attach the System Cable 25-pin connector to the SCSI port on your computer. (See Figure 1-28.)**

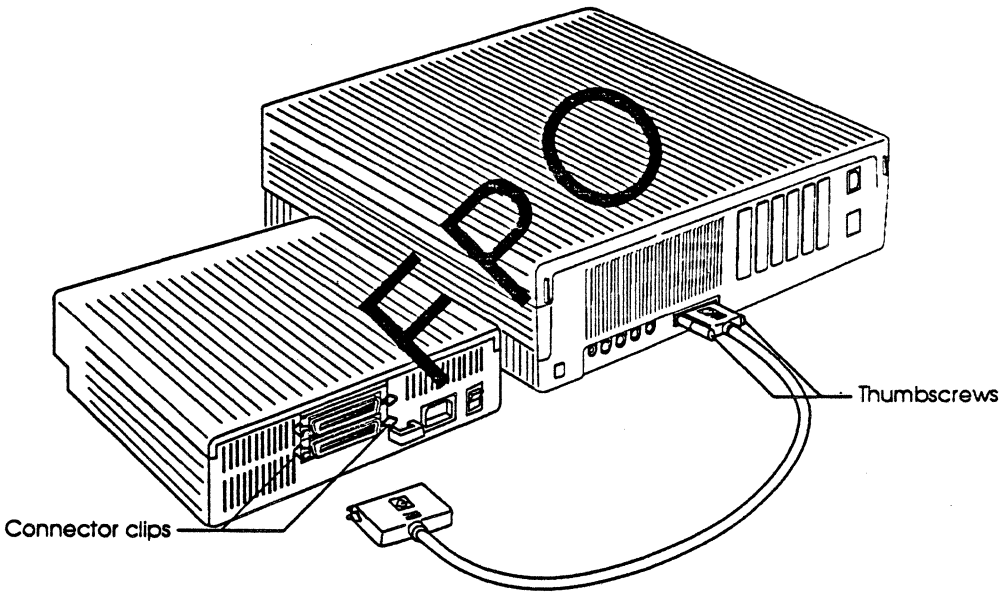

Figure 1-28
Attaching the System Cable to the Macintosh II or Macintosh IIx SCSI port

4. **Tighten the thumbscrews on the 25-pin connector.**

5. **Attach the 50-pin connector on the System Cable to a SCSI port on the back of the first external peripheral device.**

   Snap the clips into the clip brackets to secure the connection.

6. **Attach one 50-pin connector on the Peripheral Interface Cable to the available SCSI port on the first external peripheral device. (See Figure 1-29.)**

   Snap the clips into the clip brackets to secure the connection.

7. **Attach the other 50-pin connector on the Peripheral Interface Cable to a SCSI port on the second external device.**

   Snap the clips into the clip brackets to secure the connection.

8. **Attach the remaining Peripheral Interface Cables to the SCSI ports on your devices in the same way to connect all devices. (See Figure 1-29.)**

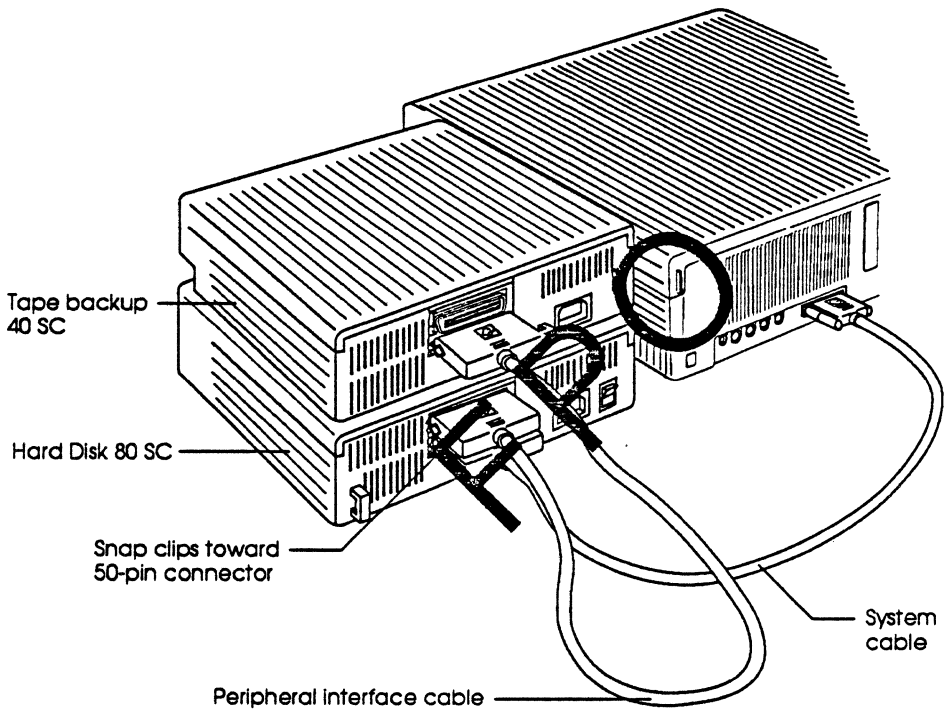

Figure 1-29
Attaching the Peripheral Interface Cable to an external SCSI device

❖ *Note:* If you're using Cable Extenders, attach them to the System Cable or Peripheral Interface Cable where you need more space between devices. Snap the clips in the same way.

9. Attach the Cable Terminator to the available SCSI port on the last SCSI device in your SCSI chain. (See Figure 1-30.)

Snap the clips into the clip brackets to secure the connection.

❖ *Note:* If the external SCSI device you're using has internal terminating resistors (see Figure 1-31), don't attach the Cable Terminator. Skip to step 10.

10. With all peripheral devices attached to your computer system and *switched off*, attach all peripheral device power cords and plug them into grounded (three-prong) AC outlets.

The switch is turned off when it's in the down position.

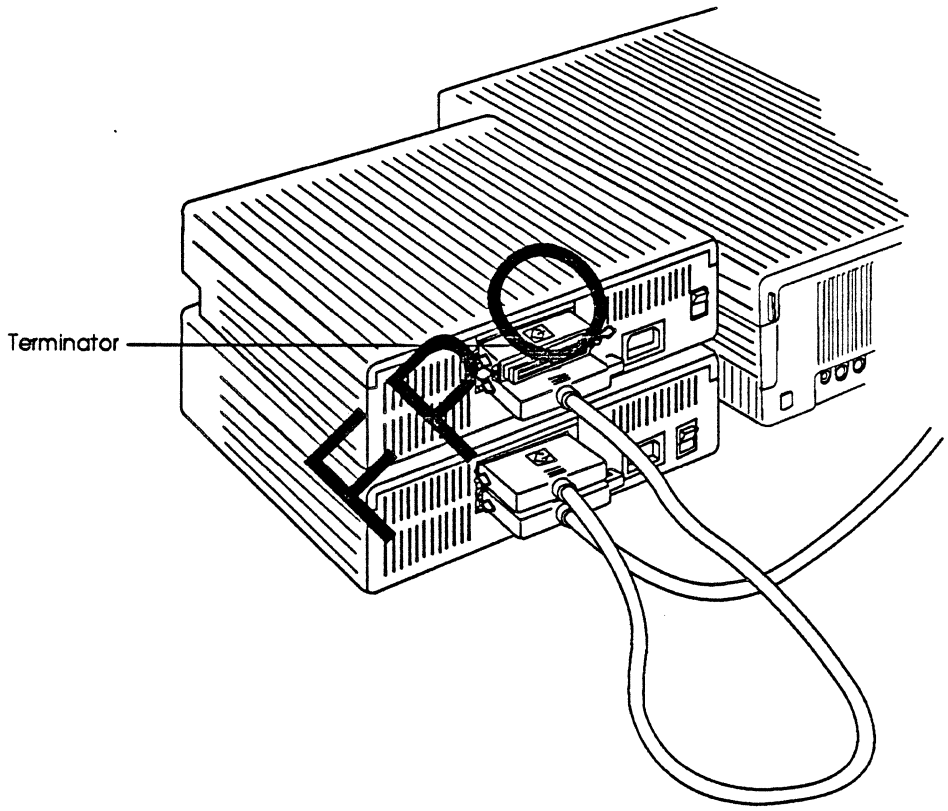

Figure 1-30
Ending the SCSI chain with a Cable Terminator

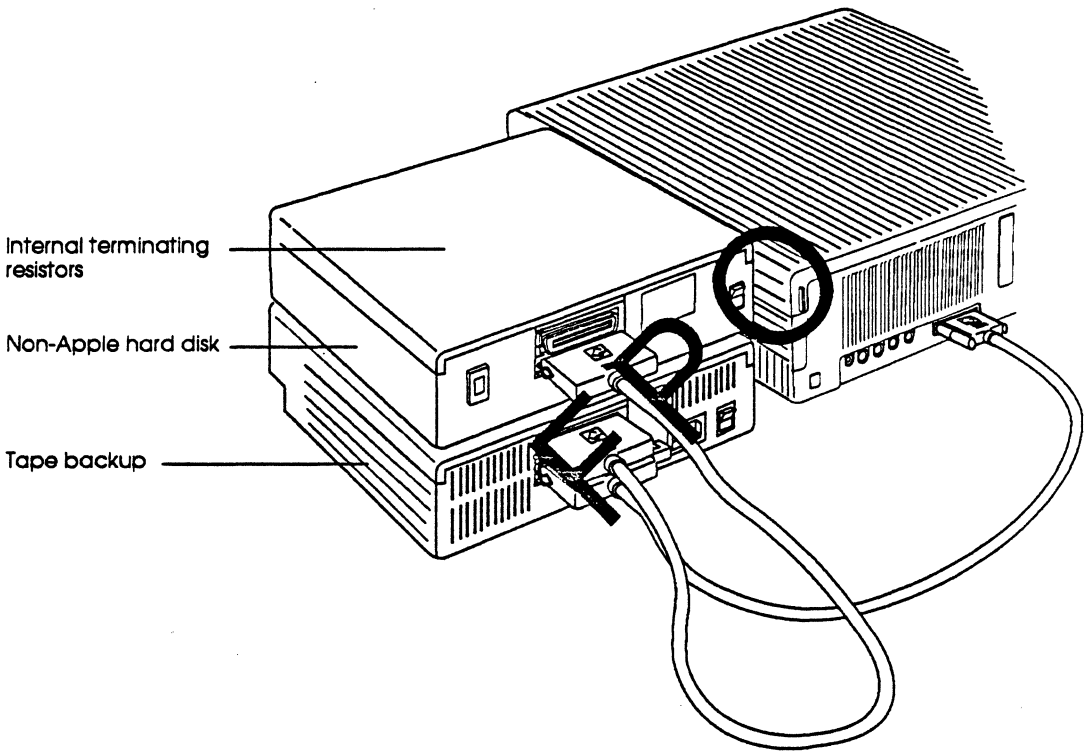

Figure 1-31
Ending the SCSI chain with a device with internal terminating resistors

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Warning: This equipment is intended to be electrically grounded.

Apple computers and peripheral devices are equipped with three-wire grounding plugs — plugs that have a third (grounding) pin. These plugs will fit only grounding-type AC outlets. This is a safety feature.

If you are unable to insert the plugs into the outlets, contact a licensed electrician to replace the outlets with properly grounded outlets.

Do not defeat the purpose of the grounding plug!

Go to Chapter 2, "Starting Up Your System."

Connecting to a Macintosh II or Macintosh IIx *without* an internal hard disk

Follow these steps to connect your system:

1. **Make sure your computer is plugged in and turned off.**

2. **Touch any of the metal connectors on the back of your computer.**

   Doing this discharges any static electricity that may be on your body.

Warning

Attach only the SCSI cable system 25-pin connector to the SCSI port on the computer.

Look for the SCSI icon on the back panel of the computer to identify the port.

Putting another type of cable connector in the SCSI port can seriously damage the SCSI circuit inside your computer, the SCSI card, or the computer itself.

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3. **Attach the System Cable 25-pin connector to the SCSI port on your computer. (See Figure 1-32.)**

4. **Tighten the thumbscrews on the 25-pin connector.**

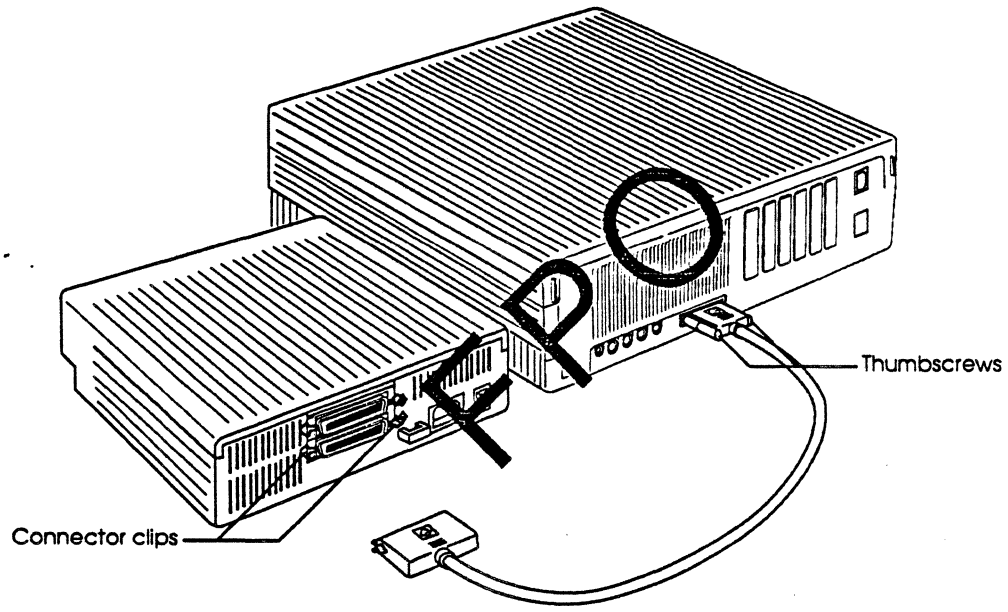

Figure 1-32
Attaching the System Cable to the Macintosh II or Macintosh IIx SCSI port

5. Attach the Cable Terminator to the 50-pin connector of the System Cable.

Press the diamond-shaped wire clips toward the connector, snapping them into the clip brackets to secure the connection (see Figure 1-33).

6. Attach the Cable Terminator-already attached to the System Cable to a SCSI port on the back of the first external peripheral device. (See Figure 1-34.)

Snap the clips into the clip brackets to secure the connection.

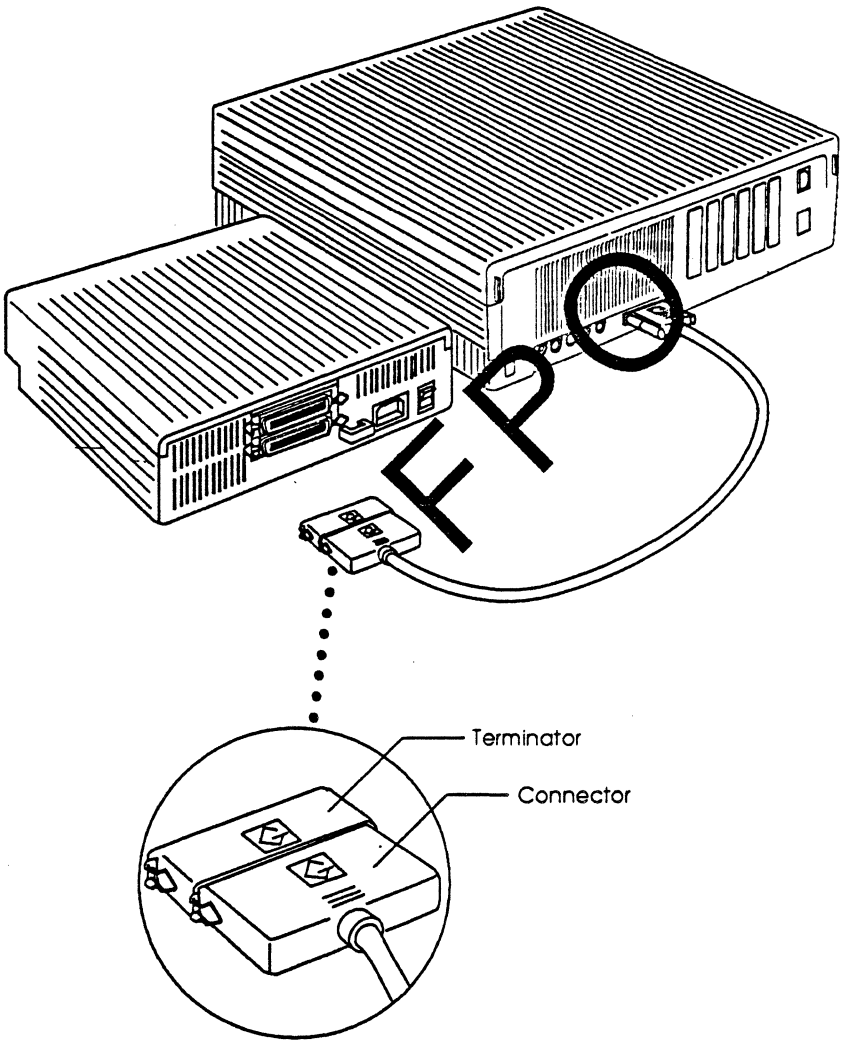

Figure 1-33
Attaching the Cable Terminator to the System Cable

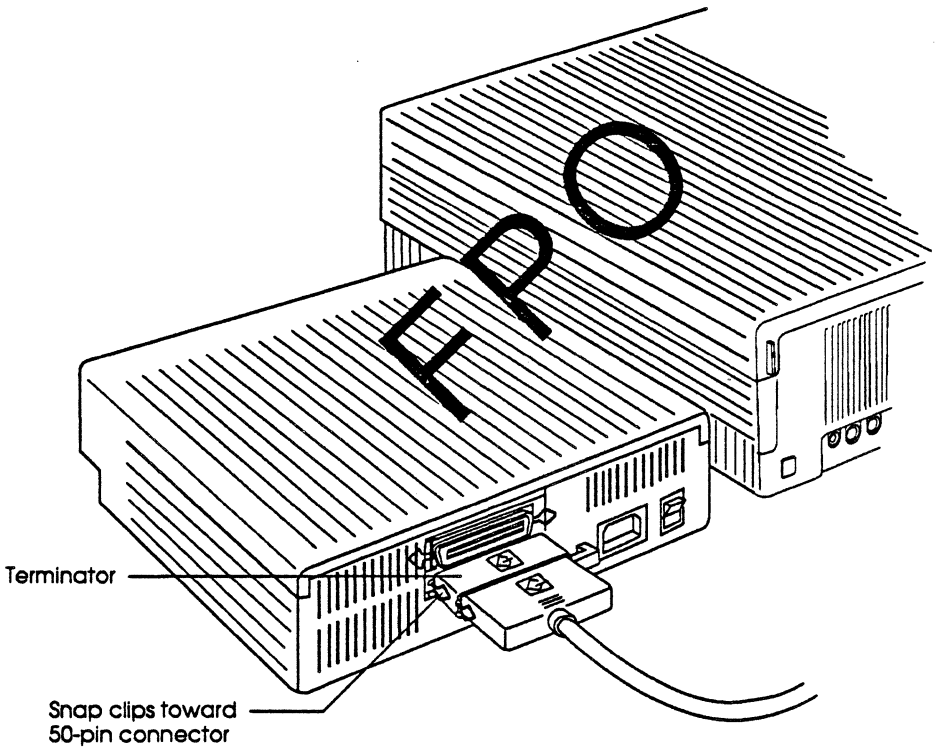

Figure 1-34
Attaching the Cable Terminator to the first external SCSI device

7. Attach one 50-pin connector on the Peripheral Interface Cable to the available SCSI port on the first external peripheral device.

Snap the clips into the clip brackets to secure the connection.

8. Attach the other 50-pin connector on the Peripheral Interface Cable to a SCSI port on the second external device. (See Figure 1-35.)

Snap the clips into the clip brackets to secure the connection.

9. Attach the remaining Peripheral Interface Cables to the SCSI ports on your devices in the same way to connect all the devices.

❖ *Note:* If you're using Cable Extenders, attach them to the System Cable with a Cable Terminator attached or to the Peripheral Interface Cable where you need more space between devices. Snap the clips in the same way.

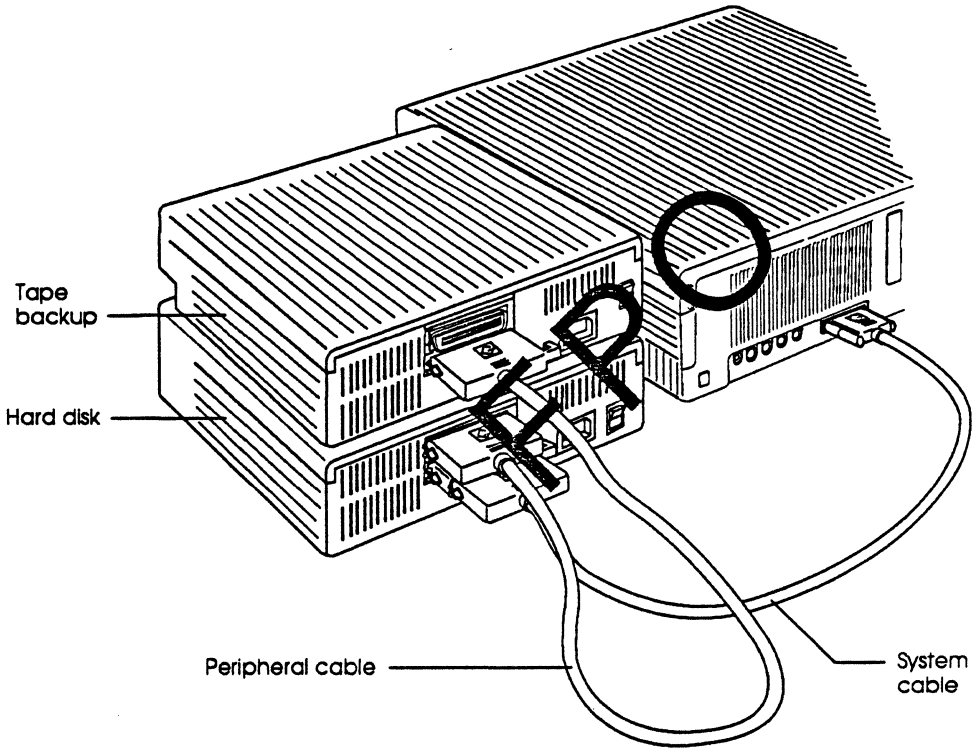

Figure 1-35
Attaching the Peripheral Interface Cable to the second external SCSI device

10. Attach the second Cable Terminator to the available SCSI port on the last SCSI device in your SCSI chain. (See Figure 1-36.)

Snap the clips into the clip brackets to secure the connection.

❖ *Note:* If the external SCSI device you're using has internal terminating resistors, don't attach the Cable Terminator. Skip to step 11.

11. With all peripheral devices attached to your computer system and *switched off*, attach all peripheral device power cords and plug them into grounded (three-prong) AC outlets.

The switch is turned off when it's in the down position.

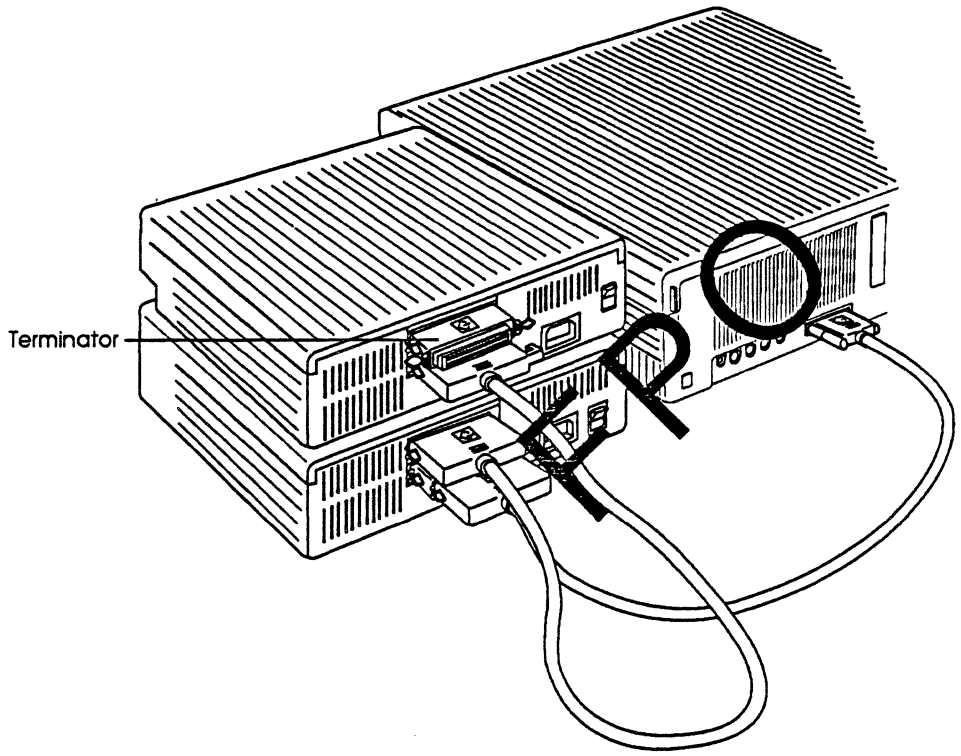

Figure 1-36
Ending the SCSI chain with a Cable Terminator

Warning: This equipment is intended to be electrically grounded.

Apple computers and peripheral devices are equipped with three-wire grounding plugs—plugs that have a third (grounding) pin. These plugs will fit only grounding-type AC outlets. This is a safety feature.

If you are unable to insert the plugs into the outlets, contact a licensed electrician to replace the outlets with properly grounded outlets.

Do not defeat the purpose of the grounding plug!

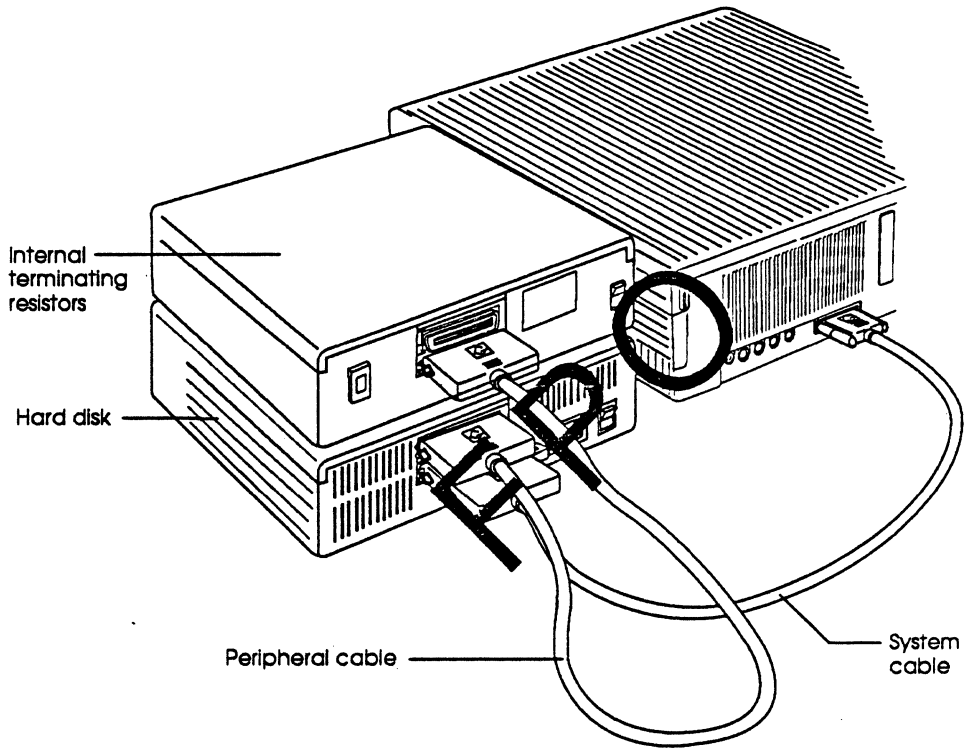

Figure 1-37
Ending the SCSI chain with a device with internal terminating resistors

Go to Chapter 2, "Starting Up Your System."

Adding a SCSI device to an existing SCSI chain

If your Macintosh already has other *external* SCSI peripheral devices connected, use this section to connect your SCSI device.

When you have a SCSI chain attached to your Macintosh, you move the Cable Terminator to the additional SCSI device and connect that SCSI device to the last connected device in your chain.

You need a Peripheral Interface Cable and the power cord for the device. Follow these steps to connect your system:

1. Make sure your computer is plugged in and turned off.

2. Place the SCSI device where you want it.

3. Touch any of the metal connectors on the back of your computer.

Doing this discharges any static electricity that may be on your body or clothes.

4. Remove the Cable Terminator from the last connected device in your chain.

If you have one device connected, move the terminator so that it is between the System Cable and a SCSI port on your device.

5. Attach one 50-pin connector on the Peripheral Interface Cable to the available SCSI port on the last connected peripheral device as shown in Figure 1-38.

Snap the clips into the clip brackets to secure the connection.

6. Attach the other 50-pin connector on the Peripheral Interface Cable to a SCSI port on the additional SCSI device, as shown in Figure 1-39.

Snap the clips into the clip brackets to secure the connection.

If you're using Cable Extenders, attach them to the Peripheral Interface Cable wherever you need more space between devices. Snap the clips in the same way as you did earlier.

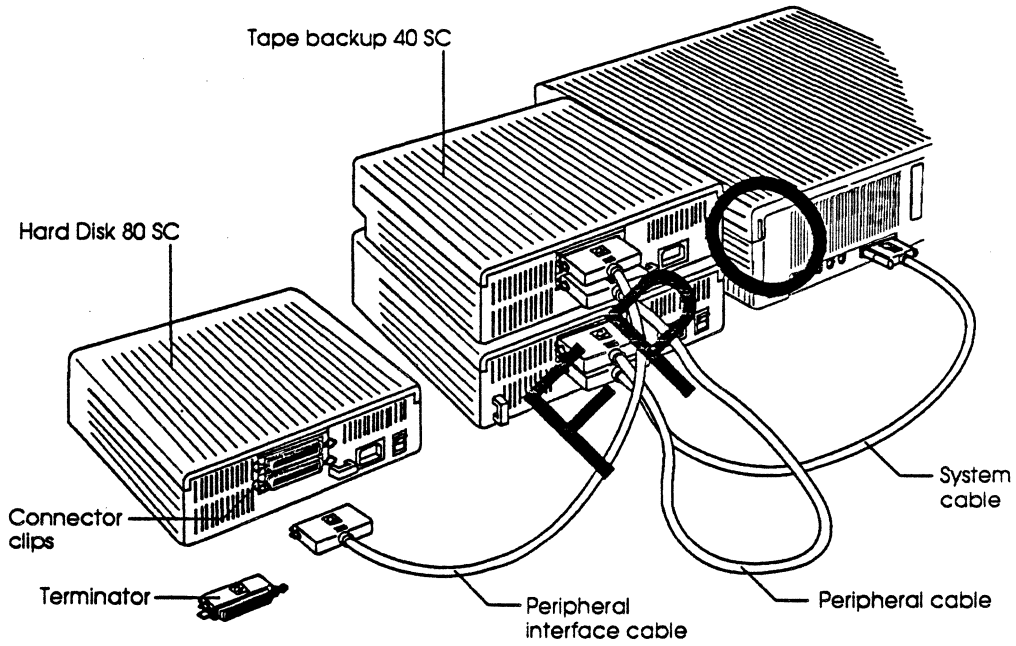

Figure 1-38
Attaching the Peripheral Interface Cable to an external SCSI device

7. Attach the Cable Terminator to the available SCSI port on the additional SCSI device, as shown in Figure 1-40.

Snap the clips into the clip brackets to secure the connection.

❖ *Note:* If the external SCSI device you're using has internal terminating resistors, don't attach the Cable Terminator. Skip to step 11.

Important

Remember that you must have a Cable Terminator on the first and last SCSI device in your chain.

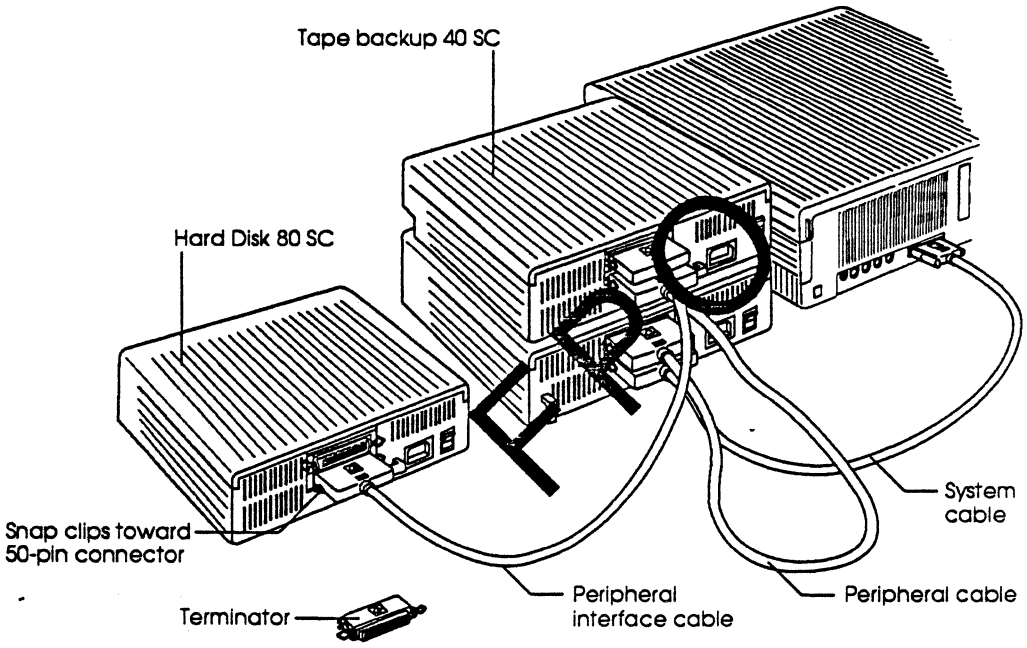

Figure 1-39
Attaching the Peripheral Interface Cable to an additional device

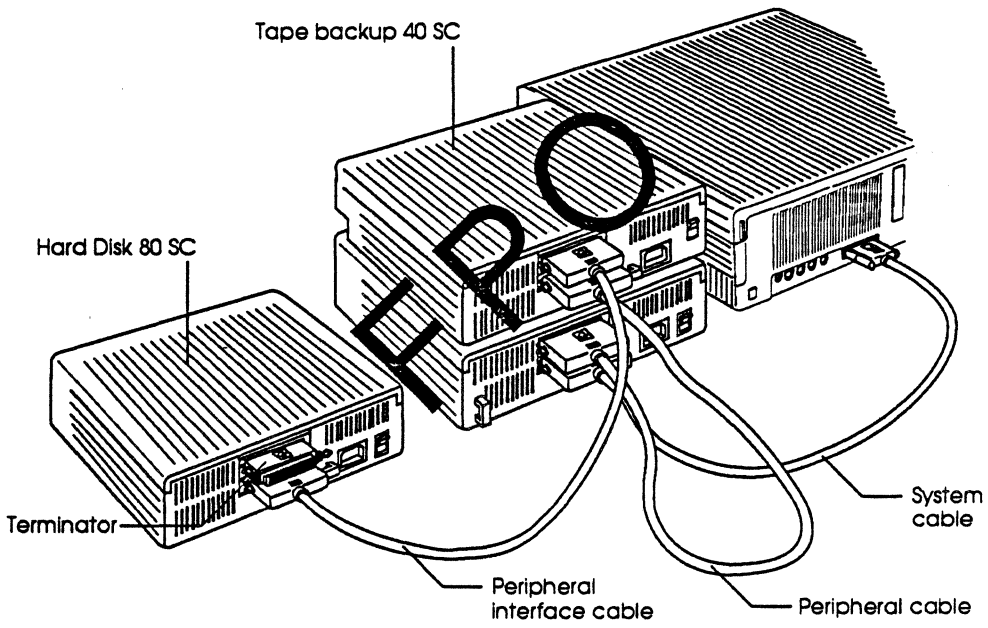

Figure 1-40
Attaching the Cable Terminator to the last SCSI device

8. With the additional SCSI device attached to your Macintosh system and all devices switched off, attach the power cord to the SCSI device, and plug the power cord into a grounded (three-prong) AC outlet.

The switch is turned off when it's in the down position.

Warning: This equipment is intended to be electrically grounded.

Apple SCSI devices are equipped with a three-wire grounding plug—a plug that has a third (grounding) pin. This plug will fit only a grounding-type AC outlet. This is a safety feature.

If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet.

Do not defeat the purpose of the grounding plug!

Go to Chapter 2, "Starting Up Your System."

Chapter 2

Starting Up Your System

This chapter explains how to turn on the power to your Macintosh II or Macintosh IIx and perform a quick test to make sure that the system is functioning properly.

- If you have A/UX *factory-installed* on an internal or external hard disk, read the first section, "Starting Up the Computer." Next choose the section that describes your hard disk, "A/UX 1.1 Factory-Installed on an Internal Hard Disk," or "A/UX 1.1 Factory-Installed on an External Hard Disk." Then read the section, "Reading the ReadMe File."
- If you are *updating an existing A/UX 1.0* system, read the section, "Starting Up the Computer." Next read the section, "Updating an A/UX 1.0 System to A/UX 1.1." Then read the section, "Reading the ReadMe File."
- If you are *installing A/UX 1.1 on a new hard disk*, read the first section, "Starting Up the Computer." Next read the section, "Installing A/UX 1.1 on a New Hard Disk." Then read the section, "Reading the ReadMe File."

❖ *Note:* If your system does not start up as described in this chapter, check Appendix A, "Troubleshooting," to get some suggestions about why the system might not have worked as expected and what you can do to correct it.

Starting up the computer

You will use the disk labeled *A/UX System Setup and ReadMe* to perform a test when you turn the Macintosh on for the first time. This disk contains all the applications and utilities you need to begin the installation process. Have it ready to insert before you go on with this chapter. This disk contains a file that provides the latest information on the installation process, including information that may have been added or changed since this manual was printed. The *A/UX System Setup and ReadMe* disk also contains the TeachText application so that the file can be opened and read. You cannot alter this file in any way.

If you have a printer attached to your Macintosh and you have the appropriate printer software installed, you can print this file. It's not necessary to print it now; you can wait and print the file when you have all your peripheral devices attached and your system is set up for printing. See the owner's guide that came with your computer for more information on printing from the Macintosh OS.

Choose the section that describes your A/UX system.

A/UX 1.1 factory-installed on an *internal* hard disk

Follow these steps to start up your computer:

1. Set your monitor's power switch to On.

Make sure the switch on the monitor shown in Figure 2-1 is pressed in even though system power is not yet on. If your monitor is connected to the power source on the Macintosh II or Macintosh IIx, the monitor will be ready to come on when you turn on your computer.

2. Press the POWER ON key to turn on your computer.

The POWER ON key, identified by a triangle, is located at the top middle of the standard keyboard and on the top right of the extended keyboard, as shown in Figure 2-2.

A beep lets you know that the computer has started. If you are turning on your system for the first time, a yellow sheet of plastic pops out of the disk drive (or drives, if your system includes a second internal 3.5-inch disk drive). Remove this plastic piece from the drive, but don't discard it. If you ever need to transport your Macintosh, inserting this sheet into the disk drive will prevent damage to the drive during shipping.

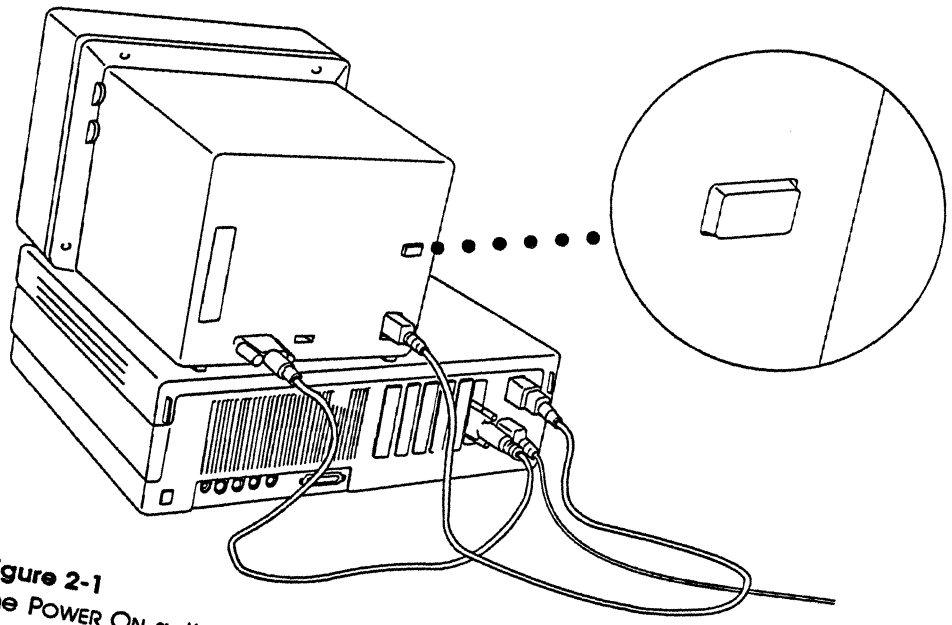

Figure 2-1
The POWER ON switch for the Apple monitor

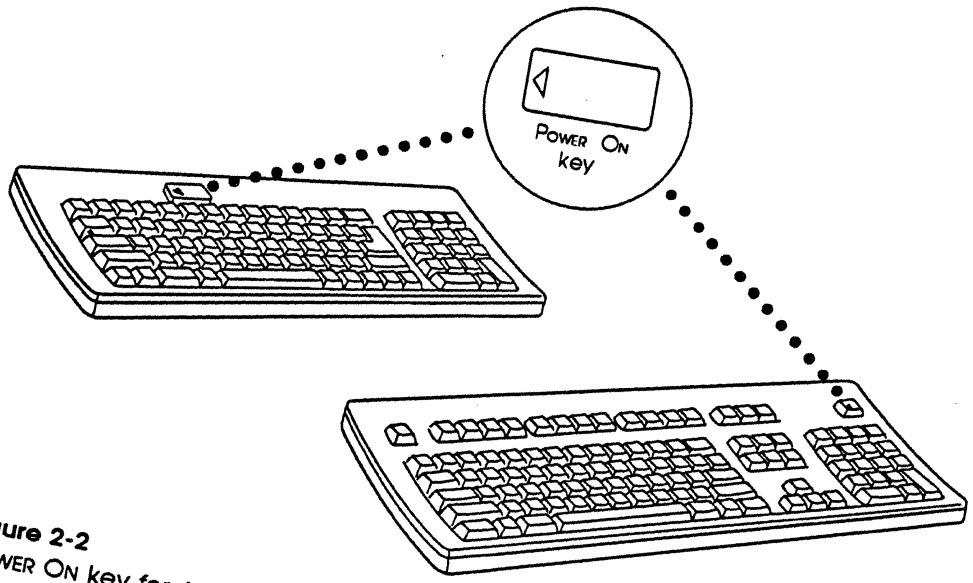

Figure 2-2
POWER ON key for Apple keyboards

Because the internal hard disk contains a small partition with a Macintosh System file, the computer starts up and the `sash` window appears with a prompt, as shown in Figure 2-3. This is the A/UX Stand-Alone Shell (`sash`). You can launch A/UX and run a limited number of A/UX system maintenance commands from `sash`. For now you will be working in the Macintosh OS, so you will need to quit `sash` to get to the Macintosh Finder™. The Macintosh Finder is the desktop environment from which you open and close files and organize your applications and files.

3. Choose Quit from the File menu.

Place the pointer over the File menu and press the mouse button. The menu opens showing you the commands available. Drag the pointer down the open menu until the Quit command is highlighted. Release the mouse button. This action is called *choosing*. You perform the same sequence whenever you want to activate a command from a pull-down menu.

You return to the Macintosh Finder, as shown in Figure 2-4.

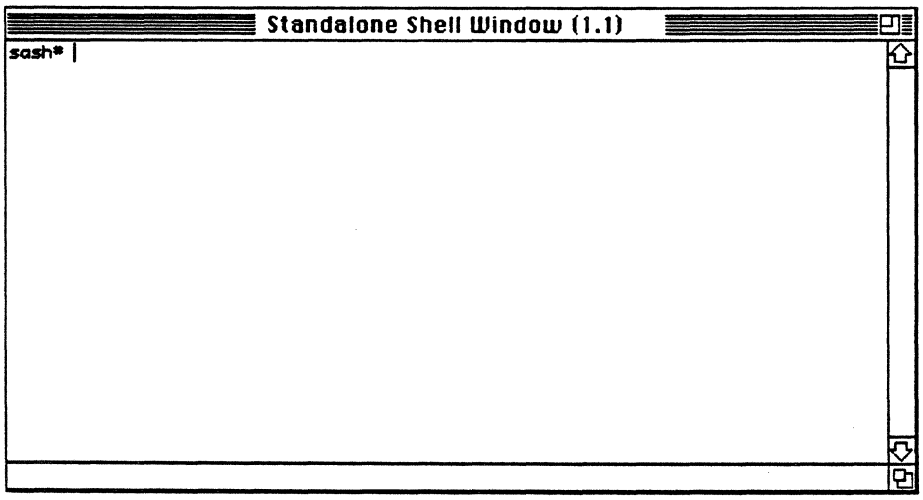

Figure 2-3
The A/UX Stand-Alone Shell (`sash`) window

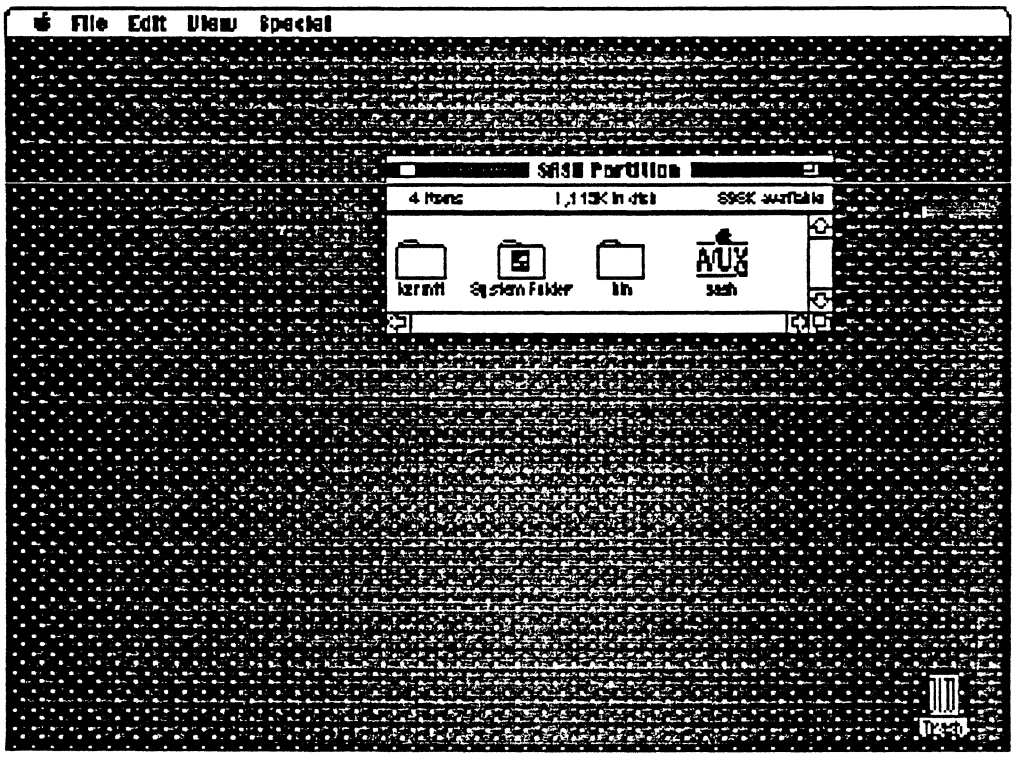

Figure 2-4
The Macintosh Finder

Go to the section, "Reading the ReadMe File," given later in this chapter.

A/UX 1.1 factory-installed on an *external* hard disk

Follow these steps to start up your computer:

1. **Turn on all external SCSI devices.**

   You see a power light on each device indicating that it is on. You hear a whirring sound as each device begins to function. Each time you turn on your SCSI system, wait ten seconds before turning on the Macintosh.

2. **Set your monitor's power switch to On.**

   Make sure the switch on the monitor as shown in Figure 2-5 is pressed in even though system power is not yet on. If your monitor is connected to the power source on the Macintosh II or Macintosh IIx, the monitor will be ready to come on when you turn on your computer.

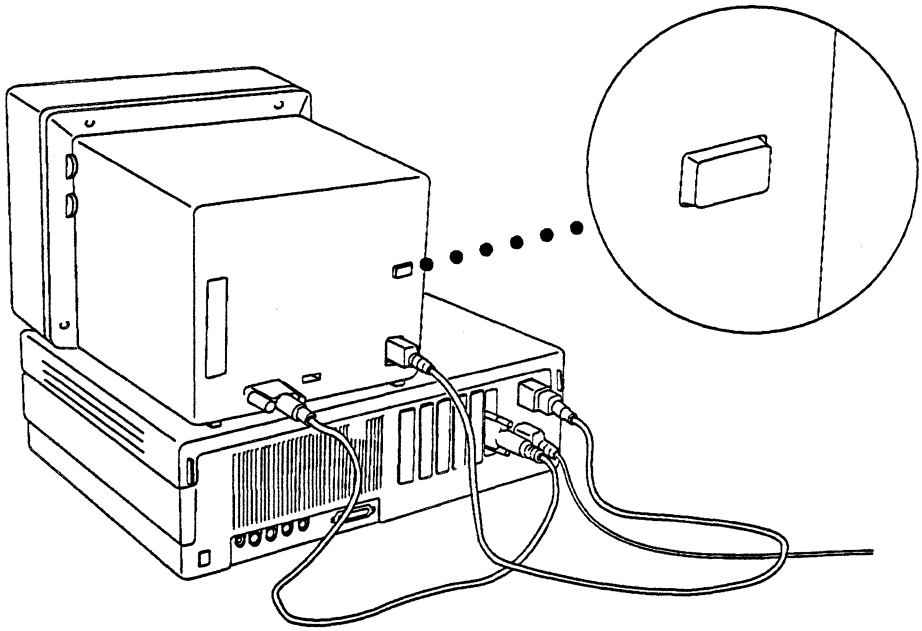

Figure 2-5
The Power On switch for the Apple monitor

3. Press the POWER ON key to turn on your computer.

The POWER ON key, identified by a triangle, is located at the top middle of the standard keyboard and on the top right of the extended keyboard, as shown in Figure 2-6.

A beep lets you know that the computer has started. If you are turning on your computer for the first time, a yellow sheet of plastic pops out of the disk drive (or drives, if your system includes a second internal 3.5-inch disk drive). Remove this plastic piece from the drive, but don't discard it. If you ever need to transport your Macintosh, inserting this sheet into the disk drive will prevent damage to the drive during shipping.

Because the hard disk contains a small partition with a Macintosh System file, the computer starts up and the `sash` window appears with a prompt, as shown in Figure 2-7. The window is the A/UX Stand-Alone Shell (`sash`). You can launch A/UX and run a limited number of A/UX system maintenance commands from `sash`. For now you will be working in the Macintosh OS, so you will need to quit `sash` to get to the Macintosh Finder™. The Macintosh Finder is the desktop environment from which you open and close files and organize your applications and files.

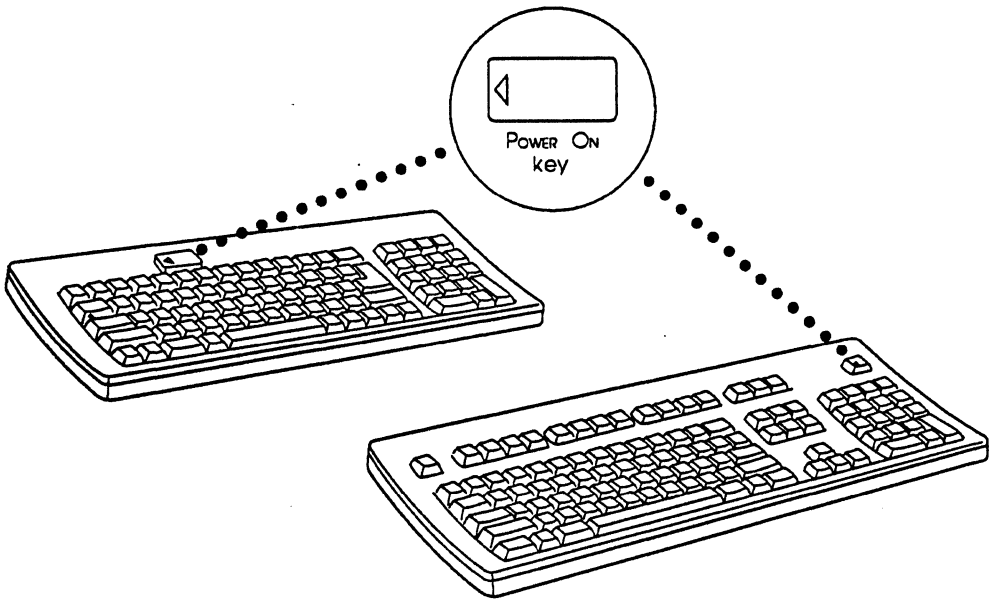

Figure 2-6
Power On key for Apple keyboards

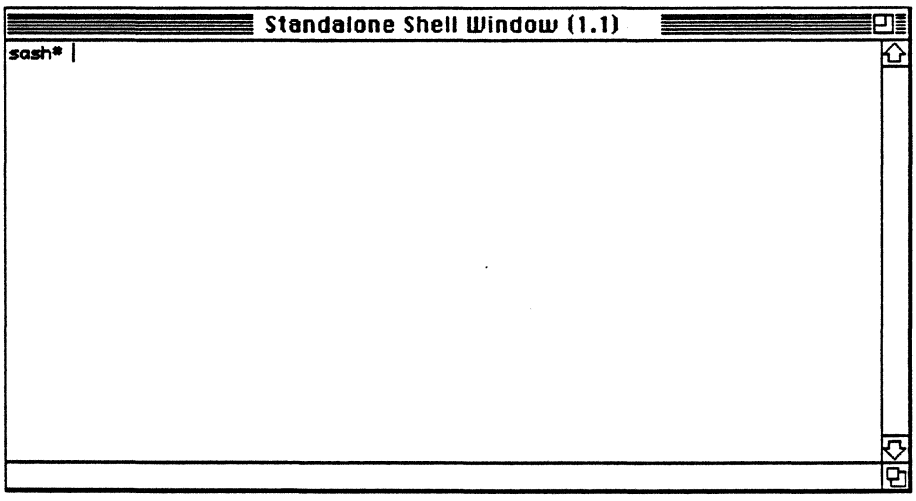

Figure 2-7
The A/UX Stand-Alone Shell (`sash`) window

4. Choose Quit from the File menu.

Place the pointer over the File menu and press the mouse button. The menu opens showing you the commands available. Drag the pointer down the open menu until the Quit command is highlighted. Release the mouse button. This action is called *choosing*. You perform the same sequence whenever you want to activate a command from a pull down menu.

You return to the Macintosh Finder, as shown in Figure 2-8.

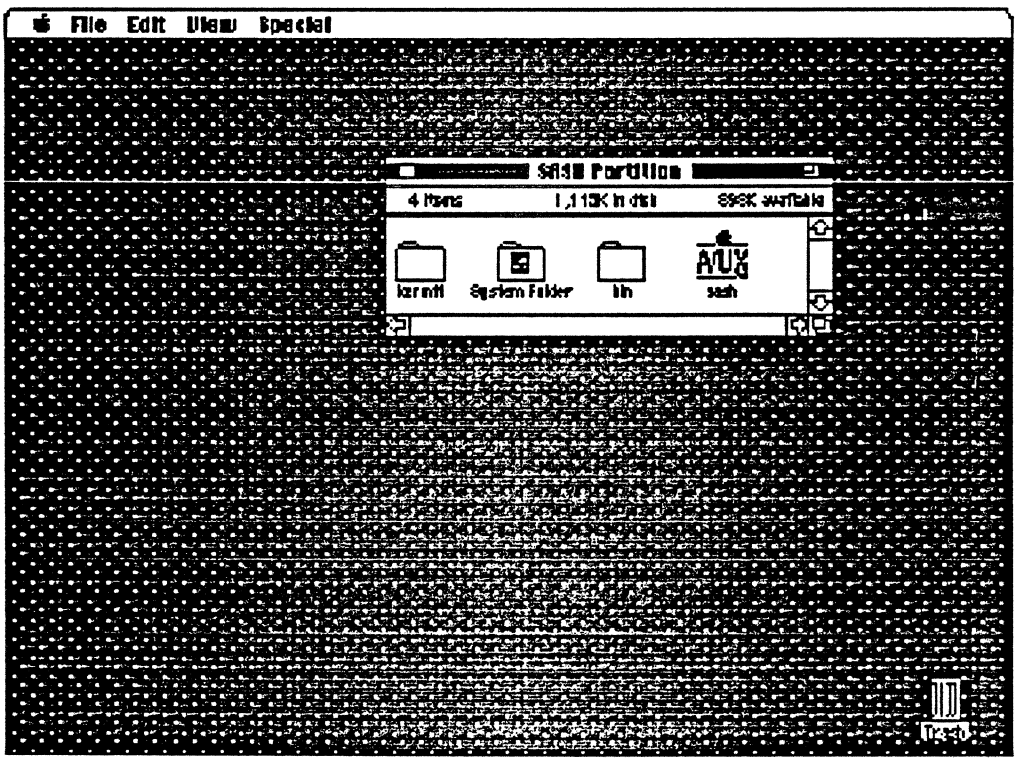

Figure 2-8
The Macintosh Finder

Go to the section, "Reading the ReadMe File," given later in this chapter.

Updating an A/UX 1.0 system to A/UX 1.1

Follow these steps to start up your computer:

1. **Turn on all external SCSI devices.**

   You see a power light on each device indicating that it is on. You hear a whirring sound as each device begins to function. Each time you turn on your SCSI system, wait ten seconds before turning on the Macintosh.

2. **Press the POWER ON key to turn on your computer.**

   The POWER ON key, identified by a triangle, is located at the top middle of the standard keyboard and on the top right of the extended keyboard.

3. **If the Stand-Alone Shell window appears, click Cancel to cancel the automatic startup sequence of `sash`.**

   Position the pointer on the button named Cancel. Press and release the mouse button rapidly. This action is known as *clicking*. You repeat this sequence whenever you want to activate a command by using a button or whenever you want to select an item to perform a subsequent operation.

4. **Choose Quit from the File menu.**

   Place the pointer over the File menu and press the mouse button. The menu opens showing you the commands available. Drag the pointer down the open menu until the Quit command is highlighted. Release the mouse button. This action is called *choosing*. You perform the same sequence whenever you want to activate a command from a pull down menu.

   You return to the Macintosh Finder, as shown in Figure 2-9.

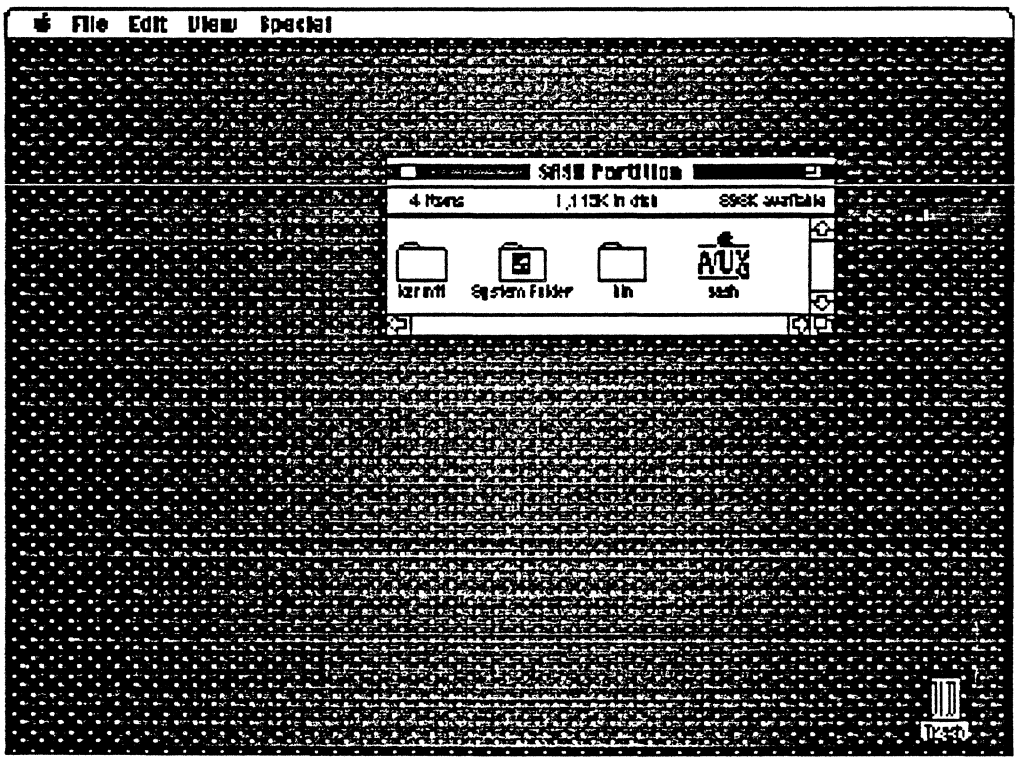

Figure 2-9
The Macintosh Finder

Go to the section, "Reading the ReadMe File," given later in this chapter.

Installing A/UX 1.1 on a new hard disk

Follow these steps to start up your computer:

1. Turn on all external SCSI devices.

You see a power light on each device indicating that it is on. You hear a whirring sound as each device begins to function. Each time you turn on your SCSI system, wait ten seconds before turning on the Macintosh.

2. Set your monitor's power switch to On.

Make sure the switch on the monitor as shown in Figure 2-10 is pressed in even though system power is not yet on. If your monitor is connected to the power source on the Macintosh II or Macintosh IIx, the monitor will be ready to come on when you turn on your computer.

If your monitor is already on, go to step 3.

3. Press the POWER ON key to turn on your computer.

The POWER ON key, identified by a triangle, is located at the top middle of the standard keyboard and on the top right of the extended keyboard, as shown in Figure 2-11.

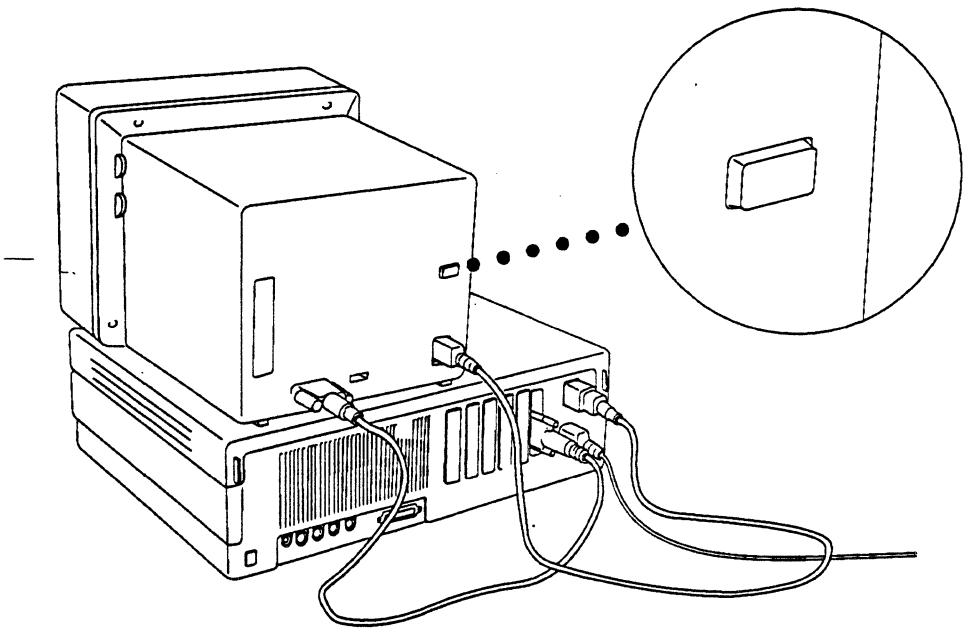

Figure 2-10
The POWER ON switch for the Apple monitor

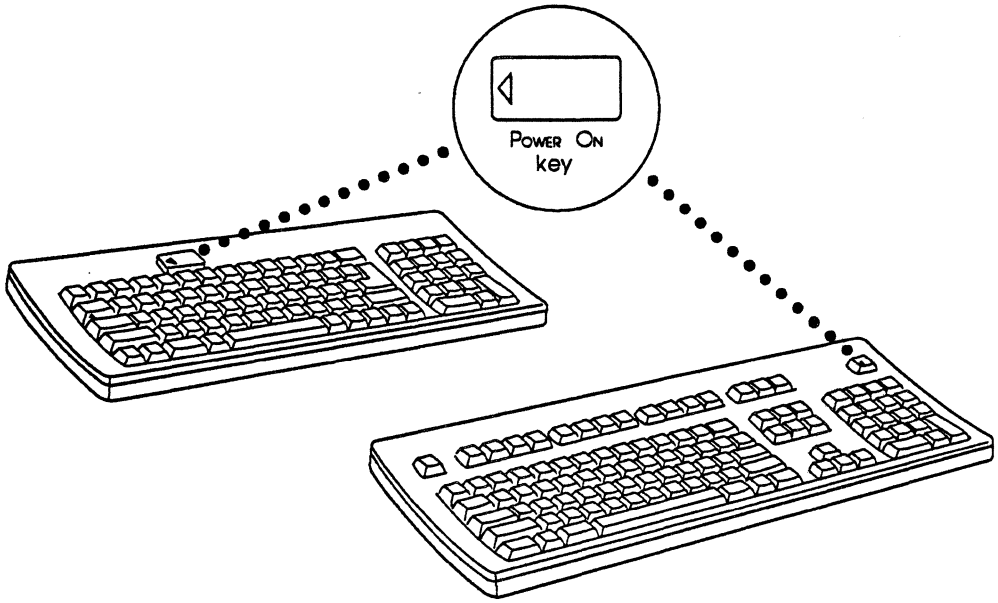

Figure 2-11
Power On key for Apple keyboards

A beep lets you know that the computer has started. If you are turning on your computer for the first time, a yellow sheet of plastic pops out of the disk drive (or drives, if your system includes a second internal 3.5-inch disk drive). Remove this plastic piece from the drive, but don't discard it. If you ever need to transport your Macintosh, inserting this sheet into the disk drive will prevent damage to the drive during shipping.

If you have an existing Macintosh OS, you see the Finder. If you haven't installed a System Folder on the hard disk yet, you see a blinking question mark.

Go to the next section, "Reading the ReadMe File."

Reading the ReadMe file

This section provides a test to make sure that your system is functioning properly. If your system started up and you are able to read the ReadMe file, you can proceed with the installation.

(If you can't read the file or open the TeachText application, check whether your cables are connected and all devices are turned on. Then check Appendix A, "Troubleshooting," for some suggestions about what to do.)

Follow these steps to read the ReadMe file:

1. **Insert the disk labeled *System Setup and ReadMe* into the internal disk drive, with the metal end first and the label side facing up.**

   If you have two 3.5-inch disk drives, insert the *System Setup and ReadMe* disk into the drive on the right. Figure 2-12 shows a disk being inserted.

   The System Setup and ReadMe window appears showing you the contents of the disk. Your screen will look like Figure 2-13.

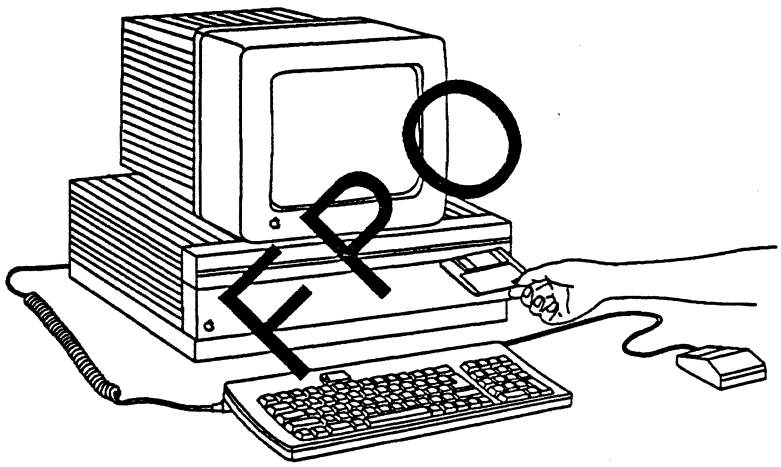

Figure 2-12
Inserting the System Setup and ReadMe disk

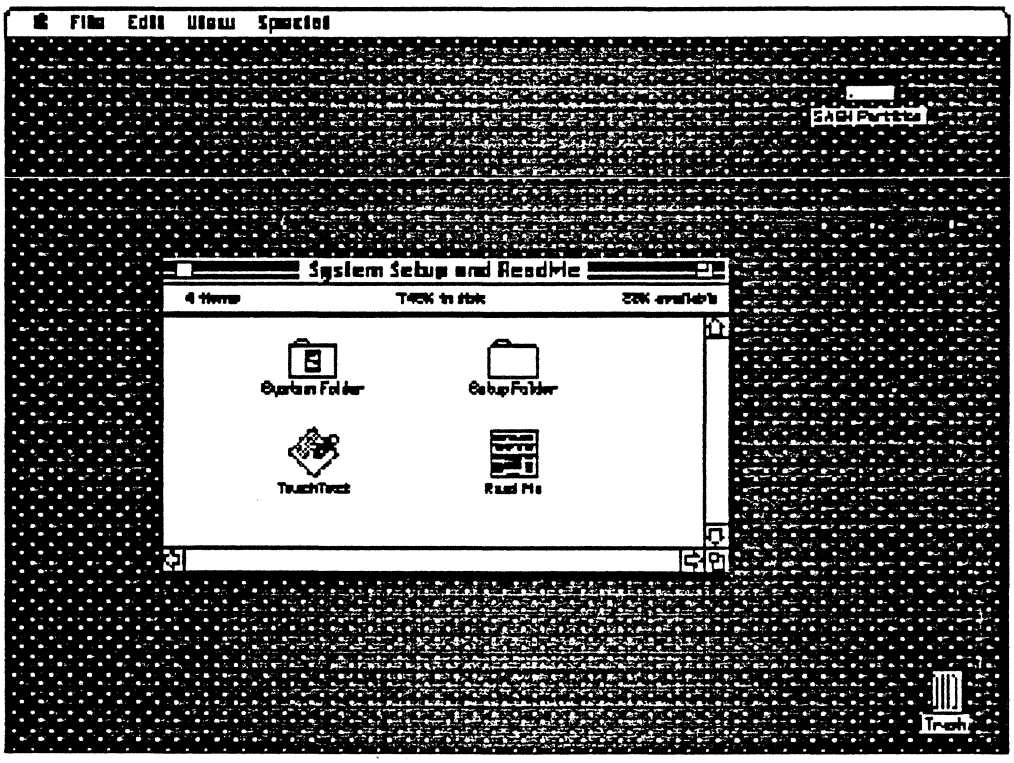

Figure 2-13
The System Setup and ReadMe window

2. Click *ReadMe* to select it.

Move the mouse to position the pointer over the icon labeled ReadMe. Press the mouse button once. This action is known as *clicking*. You repeat this sequence whenever you want to select an item to perform an operation on it.

The icon appears highlighted, as shown in Figure 2-14.

3. Choose Open from the File menu.

Place the pointer over the File menu and press the mouse button. The menu opens showing you the commands available. Drag the pointer down the menu until the Open command is highlighted. Release the mouse button. This action is called *choosing*. You perform the same sequence whenever you want to activate a command from a pull-down menu.

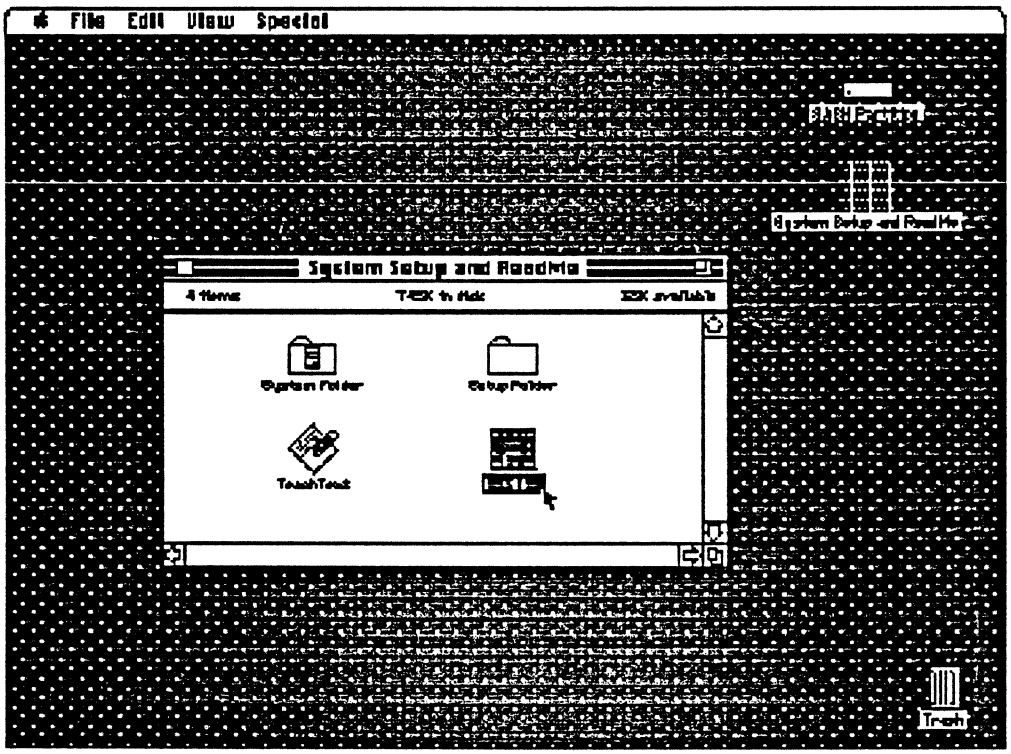

Figure 2-14
The ReadMe icon selected

A shortcut for opening files or applications is to *double-click* the icon. To double-click, position the pointer on the icon and press the mouse button twice quickly. This action automatically opens the item and you don't need to choose the menu command Open.

The contents of the ReadMe file appear on the screen, as shown in Figure 2-15. Any additions or changes to the *A/UX Installation Guide* appear at the beginning of the file.

4. Read all of the information pertaining to the installation process.

Make sure to read the information carefully and note any items that apply to your installation. Update this guide as necessary.

You can read the rest of the file later when you've finished installing A/UX. For now, go on to the next step after you read about *A/UX Installation Guide.*

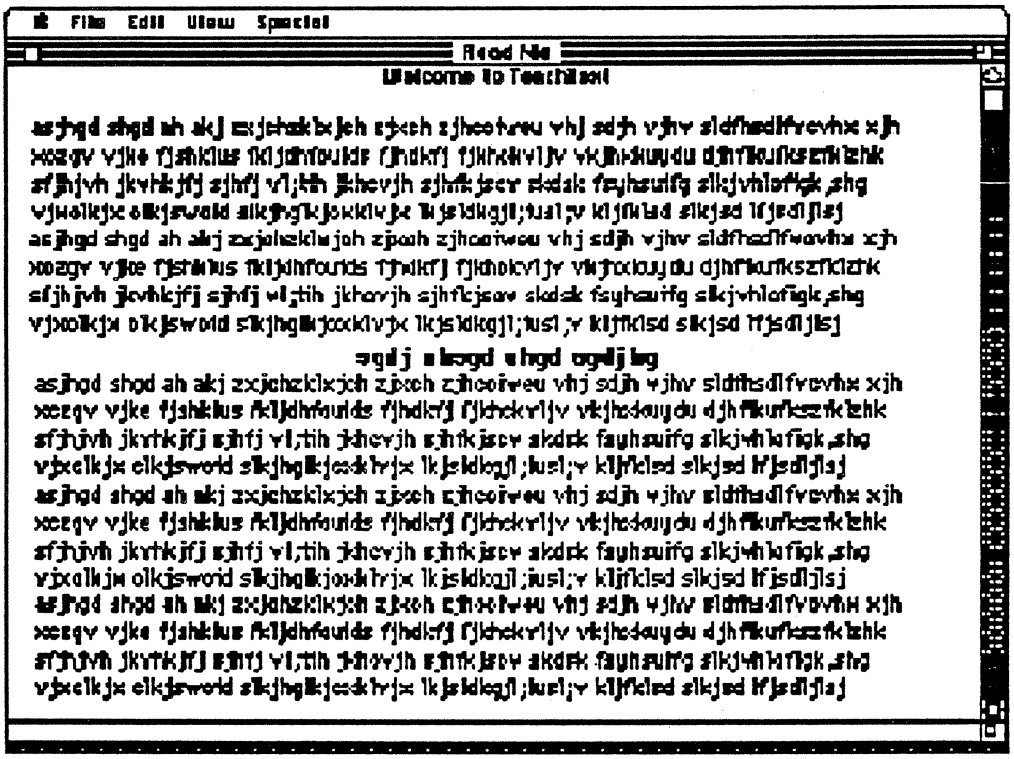

Figure 2-15
The ReadMe file

You can scroll through the text by using the scroll direction arrows on the screen. These arrows are located at the right edge of the screen. Move the I-beam (the cursor becomes an I-beam when it's on text) to the arrow pointing down on the lower right side. The cursor changes to a pointer. When you press the mouse button, the text scrolls past. You can reverse the direction of the text movement by placing the cursor on the arrow pointing up and pressing the mouse button.

5. Choose Quit from the File menu.

This command closes the file and the TeachText application. You return to the Macintosh Finder. You now need to work in `sash`, the A/UX stand-alone environment.

Figure 2-16 shows the Quit command selected.

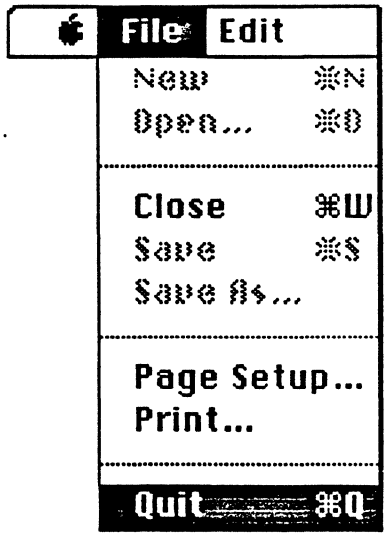

Figure 2-16
Choosing Quit

If you have A/UX 1.1 *factory-installed* on an internal or external hard disk, go to Chapter 5, "Getting Ready to Run A/UX 1.1."

If you are *updating an existing A/UX 1.0* system to A/UX 1.1, go to Chapter 3, "Organizing Your Hard Disk."

If you are *installing A/UX 1.1 on a new hard disk* using the Floppy Product or Tape Product, go to Chapter 3, "Organizing Your Hard Disk."

Chapter 3

Organizing Your Hard Disk

This chapter presents the instructions for using software to prepare your hard disk for A/UX 1.1. To prepare your hard disk you'll complete several procedures using Macintosh utilities and A/UX stand-alone utilities.

- If you are *updating an existing A/UX 1.0* system skip to the section, "Updating A/UX 1.0 to A/UX 1.1." Then you need to complete the process described in the section that follows, "Preparing the Macintosh Partition." *Don't* follow the instructions in the section "Preparing Your Hard Disk," which describe how to initialize your hard disk. Following these steps would erase all your A/UX 1.0 data.
- If you are *installing onto a new hard disk,* complete the section, "Preparing Your Hard Disk." Then you need to complete the process described in the section, "Preparing the Macintosh Partition."
- If you have A/UX *factory-installed* on an internal or external hard disk, skip this chapter and go to Chapter 5, "Getting Ready to Run A/UX 1.1."

Table 3-1 shows what section of this chapter you should read according to the installation process you're completing.

Table 3-1
What to read

Chapter sections	Preparing the hard disk	Updating to A/UX 1.1	Preparing the Macintosh partition
Updating from A/UX 1.0 to A/UX 1.1	—	X	X
Installing to a new hard disk	X	—	X
Factory-installed A/UX	Skip this chapter and go to Chapter 5.		

Preparing your hard disk

This section presents the steps you need to perform to initialize and partition your hard disk. The steps given here are necessary only if you are installing A/UX from a tape cartridge or from 3.5-inch disks.

Warning

Initializing the hard disk or installing A/UX on a disk that already contains other data destroys everything previously installed on the disk. If you have an existing A/UX 1.0 system, *do not* complete this procedure. Go to the section, "Updating A/UX 1.0 to A/UX 1.1."

Before you install A/UX on your Apple Hard Disk SC for the first time, you must initialize the hard disk — that is, prepare it to receive information by organizing its surface into tracks and sectors. Initializing a hard disk erases any existing information on it.

After initializing you must partition the disk — divide it into separate areas for use by different parts of A/UX and the Macintosh OS. A partitioned disk is similar to a dresser of drawers, as shown in Figure 3-1. Just as you store different clothing items in different drawers, you store different operating systems and different parts of operating systems in separate partitions on a hard disk. Figure 3-1 illustrates a disk partitioned for use with A/UX.

Important

If you have a hard disk that you've already used with the Macintosh OS or with an Apple II, and you want to use the hard disk for A/UX now, you need to initialize it as described in this section. If you want to use the data on the hard disk with an operating system other than A/UX, you must back up the data using a utility like HD Backup and then restore the data on another hard disk.

For more information on using a backup utility, see *Macintosh Utilities User's Guide*, which came in the accessory kit with your Macintosh computer or with a system software update.

To initialize the hard disk and partition it for use with A/UX, you use the Macintosh OS. Each of these procedures takes only a few minutes. If you are already familiar with the Macintosh OS, you can complete these steps by following only the boldface instructions. If you are unfamiliar with the Macintosh OS, details follow each step explaining the use of the mouse, the menus, and the dialog boxes.

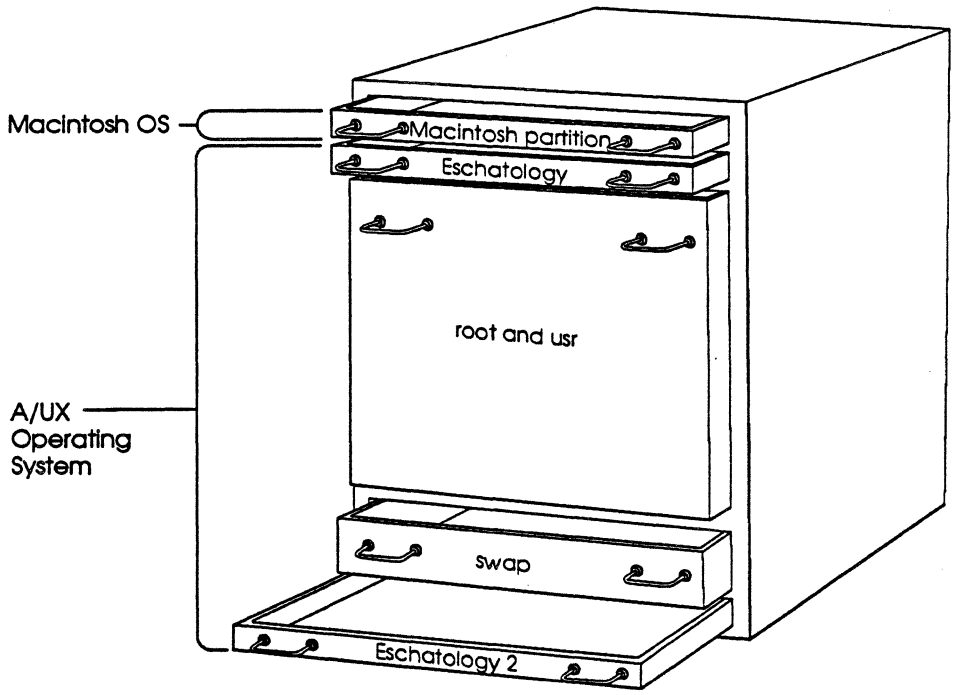

Figure 3-1
A disk partitioned for A/UX

After you complete the installation, you can get a brief introduction to the Macintosh OS and learn the basics you need to work with A/UX by reading *Getting Started With A/UX*. You can also get a thorough introduction to the Macintosh OS by using the training disk or the tutorial in the Macintosh II or Macintosh IIX owner's guide. The Macintosh accessory kit that accompanies your computer contains the owner's guide, training disk, system software disks, and utilities disks.

Initializing the hard disk

To prepare your HD 80SC hard disk, you'll use HD SC Setup version 2.0, which is found in the Setup Folder on the *System Setup and ReadMe* disk.

You inserted this disk to start up the computer. It is important that you use the version of HD SC Setup included on this disk because earlier versions of HD SC Setup do not support A/UX.

- *Note:* If you are using a hard disk purchased from a vendor other than Apple, you might not be able to use HD SC Setup to initialize and partition the disk. Contact your hardware vendor for guidelines.

Follow these steps to initialize your hard disk:

1. Click Setup Folder.

Position the pointer over the icon and press the mouse button (*click*). The icon appears highlighted.

2. Choose Open from the File menu.

As a shortcut, you can *double-click* (press the mouse button twice quickly) the icon to open the folder. The contents of the folder appear in a window labeled Setup Folder, as shown in Figure 3-2.

3. Click the HD SC Setup icon to select it.

The icon appears highlighted, as shown in Figure 3-3.

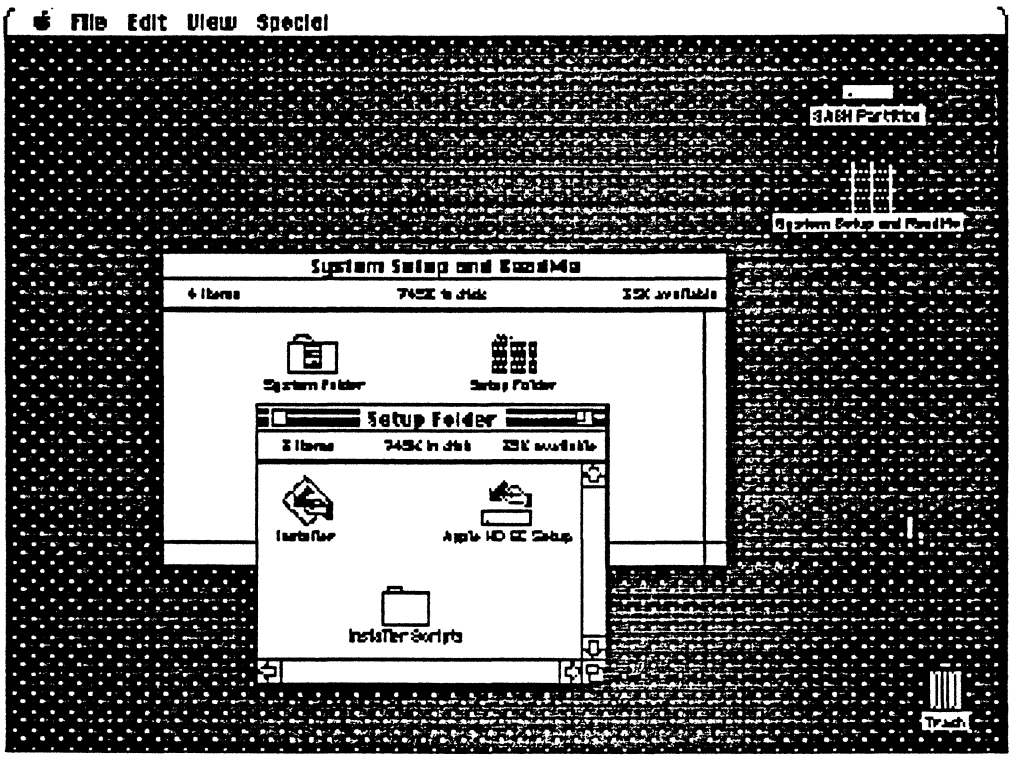

Figure 3-2
The Setup Folder window

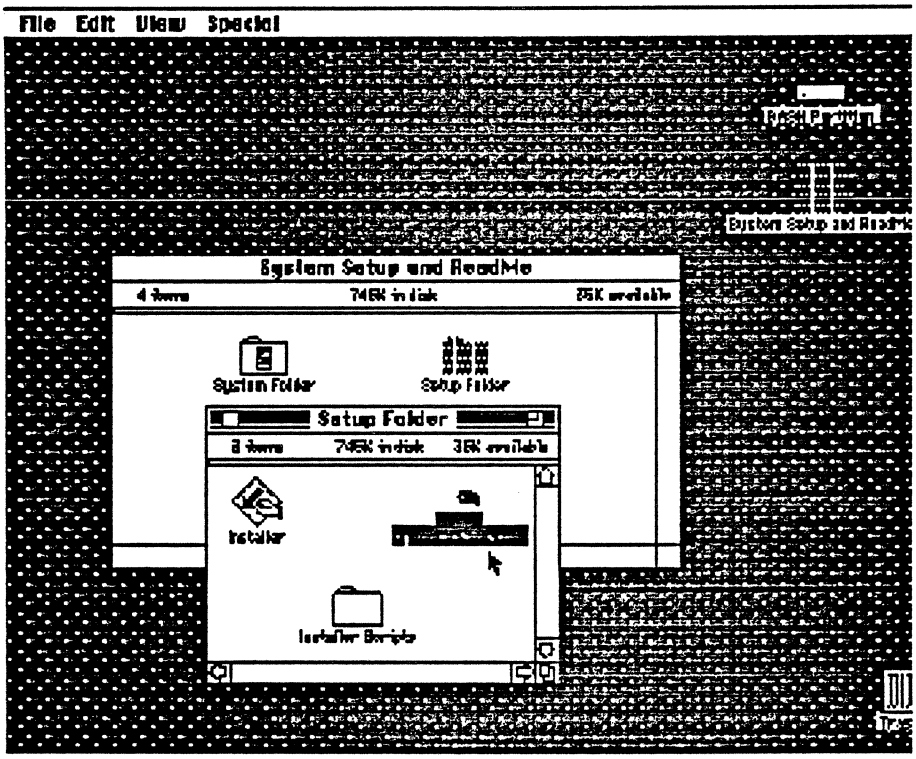

Figure 3-3
HD SC Setup Icon selected

4. Choose Open from the File menu.

This command opens the Apple HD SC Setup application. The Apple HD SC Setup dialog box appears, as shown in Figure 3-4.

Next to the words `SCSI Device` is a number from 0 to 6. If you have only one hard disk SC, the preset number of the disk drive automatically appears as the SCSI device number.

Important

If you have two or more hard disk SCs connected, make sure that the SCSI device number matches the SCSI ID indicator number of the hard disk you want to initialize.

If they do not match, click Drive until they do. The SCSI ID number of your Apple internal hard disk is always 0. Apple external hard disks come set to 5. If you have a SCSI hard disk from another manufacturer, consult your hard disk owner's guide.

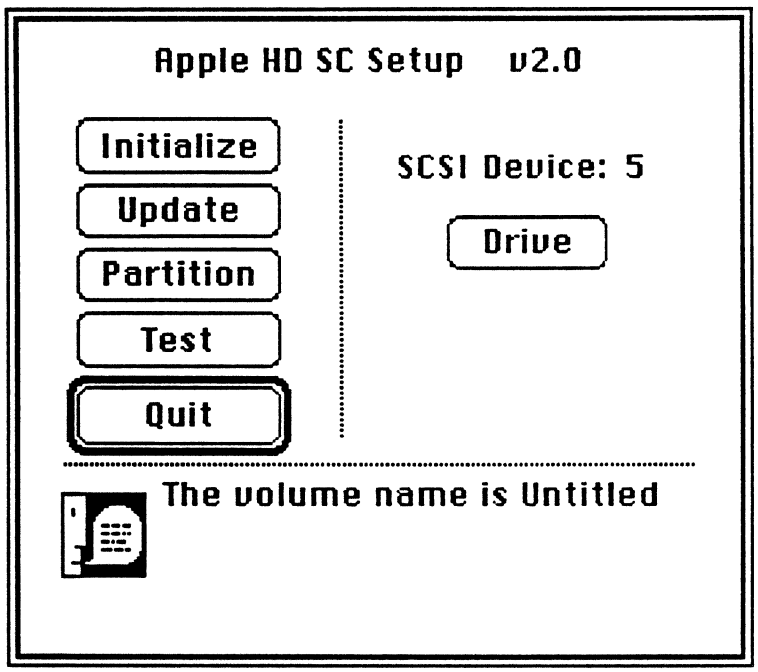

Figure 3-4
The Apple HD SC Setup dialog box

Each time you click Drive, the program searches for a different SCSI device. If the number of the drive does not appear when you click Drive, the disk may be incorrectly connected or switched off. Check your connections and power switch.

5. Click Initialize.

Position the pointer on Initialize and press the mouse button once (*click*).

A dialog box like the one shown in Figure 3-5 appears, reminding you that initializing erases all the information from the hard disk.

6. Click Init.

Position the pointer on Init and press the mouse button once. If you want to cancel the procedure, click Cancel.

Messages explaining the course of the initialization appear in the Setup dialog box. Initialization takes several minutes. In addition to preparing the hard disk, the Initialize command automatically tests the disk and installs the driver program, which controls the exchanges between the hard disk and your Macintosh.

Figure 3-5
The initialization alert box

If you see a message that the hard disk failed to initialize properly, check all cables and terminators to make sure the connections are tight. Then try again. If you are still unable to initialize, there may be a hardware problem. See your authorized Apple dealer.

At the end of the initialization process the main setup dialog box appears telling you that the initialization was completed successfully. It prompts you for a name for the disk.

7. Name the disk SASH Partition.

The text entry box in the dialog box is highlighted. Type the name: `SASH Partition`.

If this prompt does not appear, you can edit the disk name later in the Macintosh Finder. See the owner's guide that came with the computer for instructions.

8. Press RETURN.

This accepts the new name and returns you to the main HD SC Setup dialog box.

Go to the next section, "Partitioning the Hard Disk," to finish preparing your hard disk.

Partitioning the hard disk

Before you can install A/UX 1.1, you need to partition the hard disk. Partitioning divides the hard disk into segments to store data. With HD SC Setup running and the HD SC Setup dialog box on the screen, follow these steps to partition the disk.

1. Click Partition.

Position the pointer on the Partition button and press the mouse button once.

The Partition dialog box appears. The hard disk icon on the right represents the disk you just initialized and named SASH Partition, as shown in Figure 3-6.

2. Select A/UX Setup.

This partition scheme creates the following partitions:

- a minimum Macintosh partition, for startup files
- a Root and Usr partition, for executable and data files
- a Swap partition, for virtual memory
- two Eschatology partitions, for Autorecovery purposes

3. Click OK.

In most cases a dialog box (shown in Figure 3-7) appears to remind you that partitioning erases all information on a hard disk. To continue, click OK.

Partitioning begins, and the main Setup dialog box appears. Status messages appear in the bottom of the dialog box. Partitioning takes only a few moments. The Setup dialog box tells you when partitioning is complete.

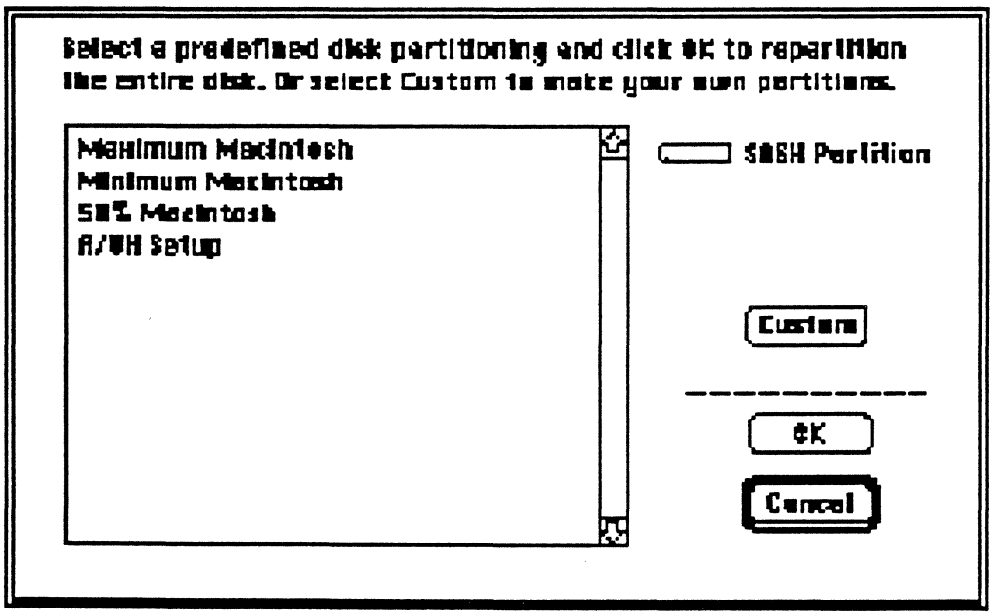

Figure 3-6
The Partition dialog box

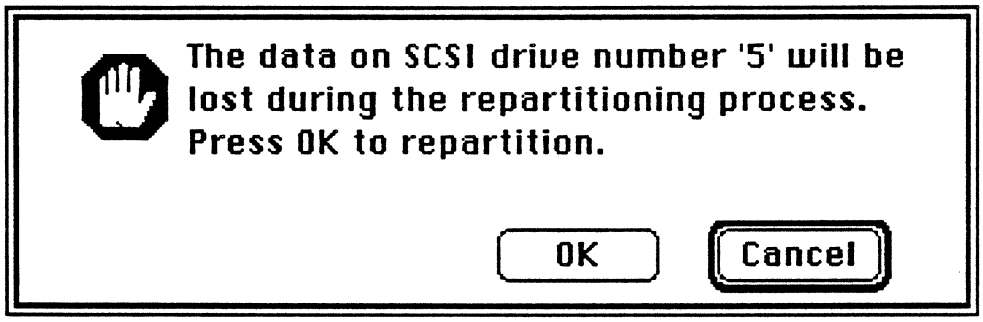

Figure 3-7
The Partition alert dialog box

4. Click Quit to return to the Macintosh Finder.

The Macintosh Finder appears. The Macintosh OS partition of the newly initialized hard disk is represented on your screen as a hard disk icon with the name SASH Partition.

Skip the section, "Updating A/UX 1.0 to A/UX 1.1" and proceed instead to the section, "Preparing the Macintosh Partition," to continue with the software setup.

Updating A/UX 1.0 to A/UX 1.1

This section describes how to update your current A/UX system to A/UX Release 1.1. The programs described here are provided to help you in the update process. You run these programs from your current A/UX operating system. You also back up your files from A/UX, although you will need 3.5-inch disks formatted in the Macintosh OS when you back up your files.

If you are installing A/UX on a new hard disk, skip this section and go on to "Preparing the Macintosh Partition."

What you need now

Have the following items available:

- *A/UX System Checker,* a disk that contains a mountable A/UX file system. This disk contains programs that you will use when preparing to update.
- At least two 3.5-inch disks that have been formatted in the Macintosh OS. You will use these disks to back up your A/UX system files.

The update process

Updating your current A/UX system to A/UX Release 1.1 is illustrated in Figure 3-8 and consists of three parts:

1. Backing up essential system files, removing obsolete files, and renaming any user files that have the same name as new system files. You can run the System Checker to help you with this process.

❖ *Note:* Although the update process will not overwrite existing user files, you should first perform a full backup of your current A/UX system. This is always recommended before you make a major reconfiguration of your A/UX system. See *A/UX Local System Administration* and `cpio`(1) for instructions on performing a full backup.

After backing up your system, you need to complete final preparations for installation as described in "Preparing the Macintosh Partition" in this chapter.

2. Installing the new A/UX 1.1 files after you have backed up essential system files. Chapter 4, "Installing A/UX from the Tape or Floppy Product," describes the installation process.

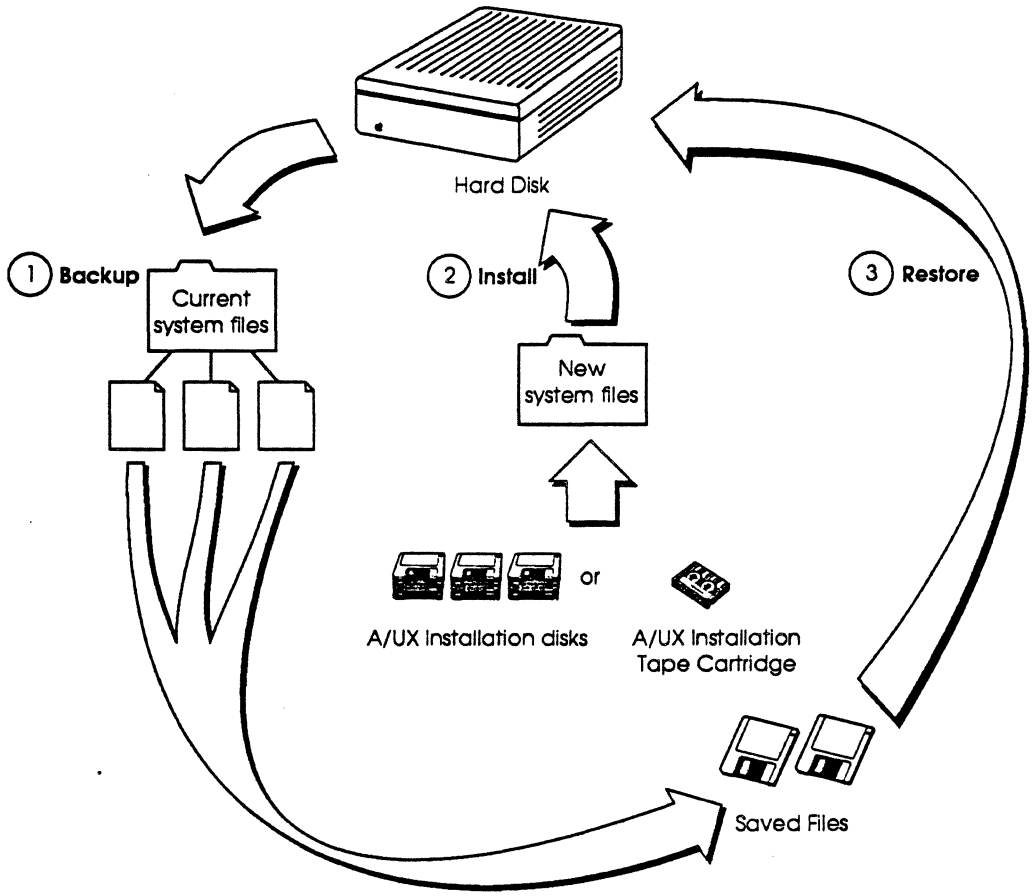

Figure 3-8
Updating your system to A/UX 1.1

3. Restoring certain system administration files that you backed up or editing the new files to restore your original system administration setups. "Restoring Saved Files" in Chapter 6 describes how to restore the files you saved.

The *A/UX System Checker* 3.5-inch disk is included with the A/UX Tape Product and A/UX Floppy Product. This disk contains two programs to help you in the update process: `syschk` (the system checker) and `bakchk` (the backup checker). You will run `syschk` to discover which of your current A/UX system files differ from the new A/UX release.

The `syschk` program returns information to you in the report file `syschk.report` in the root directory. The `/syschk.report` file lists system files in your current A/UX system that will be replaced in the new release, system files in your current A/UX system that do not exist in the new release, and any user files that have the same name as new system files.

After running `syschk`, you can use `bakchk` to make a backup copy of files reported by `syschk`. You will need 3.5-inch disks that have been formatted in the Macintosh OS (that is, by inserting a new 3.5-inch disk into the drive and responding to dialog boxes to initialize the disk) to back up files using the `bakchk` program. You will need at least one or two formatted 3.5-inch disks, more if you choose to back up user files or have modified many system files. Figure 3-9 illustrates how `syschk` and `bakchk` are used in the update process.

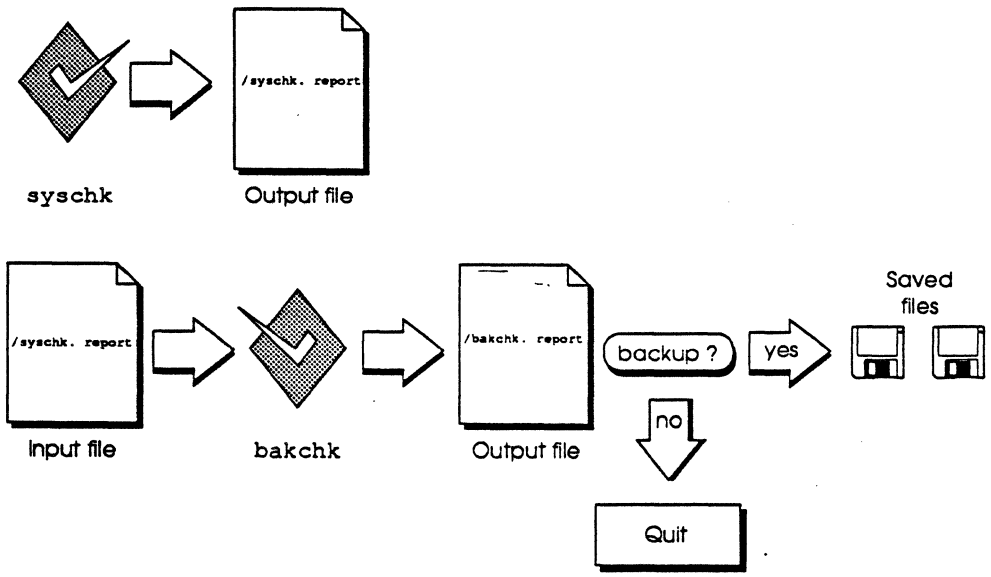

Figure 3-9
Using `syschk` and `bakchk`

Your current system and the new release

Before running `syschk` you should understand which files are on your current A/UX system and what will happen to these files after you finish updating to A/UX 1.1.

Figure 3-10 shows what could happen if you updated your system by just installing A/UX 1.1 on top of your present A/UX system. The following discussion explains how the update procedures can help you with files in each of the categories shown in Figure 3-10.

- Files in category A are those current system files that are replaced with new files of the same name. For example, `/etc/inittab` on your current system will be replaced by the `/etc/inittab` file in the new release.

  Certain files that will be replaced have essential information that you wish to preserve; for instance, your password file and parts of your `/etc/inittab` file. You can use `syschk` to identify system files that have been modified since their installation. The `syschk` program lists these files in a report file called `/syschk.report`. You can modify that list and use `bakchk` to copy listed files onto 3.5-inch disks.

- Files in category B are those current system files that are not replaced (have become obsolete), and must be removed. (For example, the file `/etc/setmactime` does not exist in the new release and should be removed before you install the new release.)

  Current system files that will not be replaced are identified in the `/syschk.report` file. You can use that list as a guide for removing files.

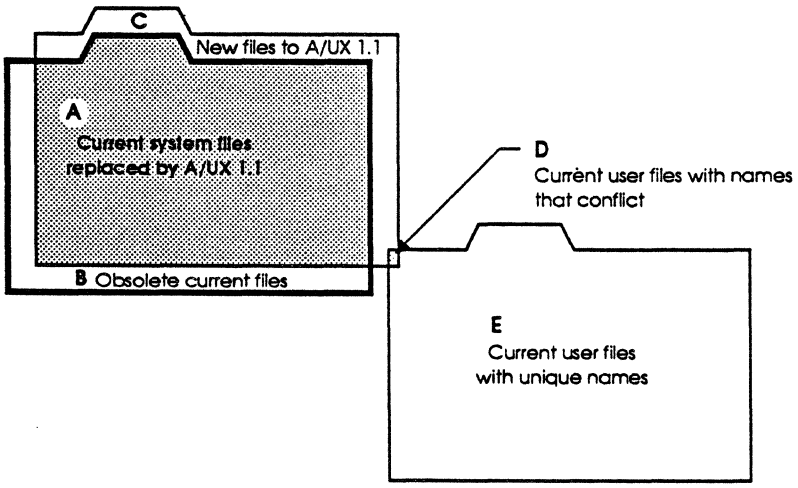

Figure 3-10
Relation of current system to new release

- Files in category C are those A/UX 1.1 system files with new and unique names. These files present no problems unless there is insufficient space on your hard disk.
- Files in category D are those user-named files that happen to have the same name as one of the new system files, and are overwritten. For example, if you have created a file named `/usr/toolboxbin/hfx`, this filename has the same name as the new system file `/usr/toolboxbin/hfx`. You should rename your file to avoid having your file overwritten by the new file. As a general rule you should not create new files in system directories such as `/etc` and `/bin`.

  The `syschk` program lists in `/syschk.report` any existing user files that will be replaced by system files in the new installation. You can use this information to rename those files or make backups of them while you are backing up the essential system files. You can later restore your own files from these copies, renaming them or placing them in an appropriate directory to avoid collision with system file names.
- Files in category E are those user-named files that do not have the same name as any of the new system files and are not overwritten. These files present no problems unless there is insufficient space on your hard disk.

Using `syschk`

The `syschk` program helps you identify the files on your current A/UX system which differ from A/UX 1.1. In addition, the `syschk` program checks to make sure you have enough space on your hard disk to install the new release. If the available space is insufficient, you will be warned and instructed to increase the free space on your hard disk before beginning installation of the new release.

Note that the files listed in `/syschk.report` include those files that have had their modification date changed, not necessarily those that have actually changed. In other words, if you used the command `touch /users/start/animals`, this file would appear in the list even if you had not actually changed the contents of the file.

When you are ready to update your system, follow these steps to run `syschk`:

1. Boot A/UX into single-user mode.

From the Finder, open the SASH Partition disk icon. Double-click the `sash` application icon. When you see the Stand-Alone Shell window enter `launch` or if you see the automatic countdown screen click Go.

When you see the prompt

```
Do you want to check the root file system? (y or n)
[default: n]
```

enter `y`.

If `fsck` prompts you to check other file systems, also answer `y`.

The `syschk` program must be run from single-user mode. If you are not already in single-user mode, enter `shutdown` to enter single-user mode and unmount all extra file systems. If either `/usr` or `/tmp` are separate file systems and local to your system, remount these from single-user mode and run `fsck` on the file systems.

2. Insert the *A/UX System Checker* disk into drive 0.

Once your system is in single-user mode, insert the *A/UX System Checker* disk into drive 0 (which is usually the one on your right, if your system has more than one).

3. Mount the disk.

Use the `mount` command to mount the *A/UX System Checker* disk on the `/mnt` directory. Enter

```
mount -r /dev/floppy0 /mnt
```

4. Use the `syschk` program to check your system.

Run `syschk` by entering

```
/mnt/syschk
```

The `syschk` program asks a question about your current release and then begins checking certain attributes of current system files. You will see a message similar to this on your screen:

```
Welcome to the A/UX System Checker.

This program examines the current attributes of files being
replaced or added in this release.  You will be notified of
files needing attention.

Your current release appears to be A/UX Release <1.0>.  If
this is correct, press RETURN.  Otherwise, enter the
correct release number:
```

5. Confirm your current release number.

Press RETURN if the release number is correct. Otherwise type the release number of your current system and press RETURN.

You will then see a message like

```
Examining the system files on your current release, comparing
their current attributes with their original attributes, as
shipped. This will take a minute or so ...
```

The `syschk` program examines files that appear to have been modified since your original system was shipped and lists them in the `/syschk.report` file. You will then see the message

```
Checking for conflicts with files added since A/UX Release
1.0 ...
```

At this time `syschk` searches for any user files that have the same name as a file on the new release and records them in the `/syschk.report` file. The `syschk` program also searches for any files on the current system that are no longer part of the A/UX release and records them in `/syschk.report`.

The `syschk` program also verifies whether you have enough room on your hard disk to install the new release and displays the message

```
Checking to see if there is enough room to install 1.1 ...
```

If you do not have enough free space on your hard disk to install the required files, you will see the message

```
Error - insufficient room on / partition. At least xxxx more
free blocks needed to install required files. Optional files
(catman, games) disregarded.
```

If you see this message you will need to back up and remove enough files to free the number of blocks of space reported by `syschk`. After removing files, run `syschk` again to verify that you have enough room to install A/UX 1.1.

If you have enough free space on your hard disk to install the required files but not enough to install the optional files you will see the message

```
Warning - limited room on / partition. At least xxxx more
free blocks needed to install optional files. Actual size
(blocks): catman yyyy, games zzzz
```

If you see this message you can either remove enough files to free the number of blocks of space reported by `syschk` or install A/UX and leave out the optional files. If you remove files, run `syschk` again to verify that you have created sufficient space to install A/UX.

When the `syschk` program has completed checking your system, you will see a short message directing you to examine the `/syschk.report` file. The `syschk` program also produces `/bakchk`, the backup checker program, `/syschk.cfloppy`, an executable file used by `bakchk`, and `/syschk.readme`, a file containing information about `syschk` and `bakchk`. The next section describes the `/syschk.report` file.

Examining the /syschk.report file

The /syschk.report file produced by syschk can easily be used as a control file for a backup utility such as cpio. You can edit this file and then use bakchk to make back up copies. Or, you can edit this file and then use it as input on a cpio command line. See "Using bakchk to Back Up Files" for information on the bakchk program.

The /syschk.report file is divided into three parts:

- Part 1 shows system files that appear to have been modified since your original system was shipped. These files will be replaced by the corresponding system files in the new release.
- Part 2 shows user files whose names conflict with those of files contained in the new release.
- Part 3 shows files that are no longer part of the A/UX release.

Use a text editor to examine your /syschk.report file. The following sections explain each part of the /syschk.report file and discuss how you can use the contents of this file to assist you in preserving essential system files, backing up user files, and removing obsolete files.

Preserving essential system files

Part 1 of the /syschk.report file shows the system files that appear to have been modified since your original system was shipped. Part 1 of a sample /syschk.report file is listed here:

```
# These files have been modified, and may need backup:
# ====================================================
.cshrc
.login
etc/cshrc
etc/fstab
etc/group
etc/hosts
etc/hosts.equiv
etc/inittab
etc/motd
etc/passwd
etc/rc
etc/startup
etc/startup.d/ae6
```

```
# unix
usr/games/lib/alienslog
usr/include/sys/buf.h
usr/include/sys/gdkernel.h
usr/include/sys/ssioctl.h
usr/lib/sendmail.st
usr/lib/spell/spellhist
usr/lib/uucp/L-devices
usr/lib/uucp/SEQF
usr/spool/cron/crontabs/root
usr/spool/lp/SCHEDLOCK
usr/spool/lp/log
usr/spool/lp/oldlog
usr/spool/lp/outputq
usr/spool/uucp/LOGFILE
```

These files will be replaced by the corresponding system file in the new release. You can use `bakchk` to back up these files as explained later in "Using `bakchk` to Back Up Files."

When you install A/UX 1.1, your system will contain the new system files. You can then restore your old system files or modify the new system files to include your customized information. (For example, you can back up `/etc/inittab`, and after installing the new release, incorporate the changes from your old `/etc/inittab` file into the new `/etc/inittab` file.) "Restoring Saved Files" in Chapter 6 helps you in customizing your new A/UX system.

Follow these steps to decide which system files to back up:

1. Carefully read the list of modified files in the `/syschk.report` file.

A general rule is to back up those filenames that you recognize and those files that you may have modified. Most files in `/etc` should be backed up. You probably do not need to back up files such as old log files.

2. Edit `/syschk.report`.

Edit the `/syschk.report` file and put a number sign (#) in the first column of each line containing a filename that you do not want to back up (or simply delete the line from the file). For example, you will notice that `unix` has a # in the first column, because this kernel will be obsolete once you install the new release. Files such as old log files (for example `/usr/spool/lp/oldlog`) and binary files probably do not require backup.

Preserving user files

Part 2 of the `/syschk.report` file lists those user files that happen to have the same name as one of the system files contained in the new release. You must rename these files to avoid having them overwritten when the new release is installed.

Part 2 of a sample `/syschk.report` file is listed here:

```
# These files conflict with files added in the new release:
# ========================================================
nextunix
usr/lib/cron/log
```

Follow these steps to decide which user files to back up:

1. **Read the list of conflicting filenames in the `/syschk.report` file.**

   You do not need to back up or restore the `nextunix` file as a new one will be created in the new release.

2. **Edit `/syschk.report`.**

   Edit the `/syschk.report` file and put a "#" in the first column of each line containing a filename that you do not want to back up (or simply delete the line from the file).

   If you later restore any other files listed here, be sure to restore them to a new directory to avoid overwriting the new system files with the same name.

   If you want to add any user data files to this list, add them after the list of modified files (Part 1) but before the list of filename conflicts (Part 2). The installation process will not overwrite any user data files that have names which are unique from names of system files. (However, you should always make a full backup of your system before reconfiguring your system.)

   Note that relative pathnames of files are listed in `/syschk.report`, so restoring these files is easier. You should also use relative pathnames without a leading slash (/) if you add any files to this list.

Identifying files to remove

Part 3 of the `/syschk.report` file contains a list of all system files on your current A/UX system that are no longer part of the A/UX release. In most cases you should remove these files from your hard disk.

Part 3 of a sample `/syschk.report` file is listed here.

```
# These files are no longer in A/UX, and should be removed:
# ========================================================
README
bin/crypt
bin/diffmk
etc/bind/master/named.ca
etc/bind/master/named.db
etc/delivermail
etc/setmactime
lib/libg/libPW.a
lib/libg/libc.a
lib/libg/libg.a
lib/libg/libm.a
lib/libg/librmt.a
lib/libg/libtermcap.a
lib/libp/libg.a
usr/bin/module_data
usr/catman/a_man/man1/dual.1m.z
usr/catman/a_man/man7/afm.7.z
.
.
```

Follow these steps to remove obsolete system files:

1. **Read the list of obsolete files in the `/syschk.report` file.**

   You might notice a long list of `usr/src` files. For space considerations, public domain source is not included in the new release. If you want to delete these files, you may do so. These files will not be overwritten if you do not delete them.

   If there are any source files in this list that you want to keep (like `usr/src/emacs`) you should back them up (although they won't be overwritten).

   Note that you do not have to add or delete any filenames from Part 3 of the `/syschk.report` file. The `bakchk` program will not back up any files listed in Part 3. Also the `/bckchk.report` file will not contain a list of any files reported in Part 3 of the `/syschk.report` file.

2. **Remove files you do not need from your hard disk.**

   In most cases, you should remove the files listed in Part 3 of `/syschk.report` from your hard disk. Especially be sure to remove the `usr/catman` files so that the `man` command correctly reflects the new release. Also note that if you get the `usr/catman` files via NFS, be sure to update the NFS server with the new `usr/catman` files.

3. Save a copy of `/syschk.report`.

If you run `syschk` again, the `/syschk.report` file will be overwritten. If you have made any changes to `/syschk.report`, for example, deleting or adding file names to Part 1 or Part 2, then save your original `/syschk.report` file by entering

```
mv /syschk.report /orig.report
```

4. Run `/mnt/syschk`.

After removing files, you should run `syschk` again to verify that the files you wanted to remove are gone. You can now examine Part 3 of the `/syschk.report` file.

5. Restore your original copy of `/syschk.report`.

Restore your original copy of `/syschk.report` by entering

```
mv /orig.report /syschk.report
```

6. Eject the *System Checker* disk.

Enter `eject` and remove the *System Checker* disk and store it in a safe place.

Using `bakchk` to back up files

The `bakchk` program is designed to help you back up your files. The `bakchk` program uses the list of files in `/syschk.report` to produce a file called `bakchk.report` in the root directory. The `/bakchk.report` file can be used as an input file to `cpio`.

If you save files yourself, without using the `bakchk` program, use relative pathnames without a leading slash (/). Always put labels on the disk(s) identifying the files and store them in a safe place.

Follow these steps to back up your files:

1. Edit the `/syschk.report` file.

Edit the contents of the `/syschk.report` file to contain the filenames you want to back up as described in "Preserving Essential System Files" and "Preserving User Files."

2. Enter /bakchk to check files in /syschk.report.

The bakchk program is in your root directory and must be run from the root directory. Do not move bakchk to any other directory. Enter

```
/bakchk
```

The bakchk program checks the /syschk.report file for inconsistencies and displays this message

```
Preliminary checks satisfied, trying dummy cpio ...
```

The bakchk program inspects the /syschk.report file to determine whether it contains acceptable input for a cpio command. If bakchk finds problems with the /syschk.report file (for example, if bakchk could not locate a file), you will see a message similar to

```
could not locate the following files:
        < foo >
        < bar >
```

and bakchk quits. If you see this message, examine the contents of the /syschk.report file and correct any errors reported by bakchk. Then run bakchk again to make sure you have corrected any problems.

3. Enter y to back up files listed in /syschk.report to a 3.5-inch disk.

If the /syschk.report file contains filename entries that will be acceptable as input to cpio, bakchk asks if you want to back up the files at this time. Then bakchk informs you of the number of 3.5-inch disks required to make the backup. Note that you must have previously formatted the 3.5-inch disks you will use for backup in the Macintosh OS.

You will see a message similar to

```
The cpio archive will require 1153536 bytes.  Do you wish
to make a cpio archive at this time?  (You must have 2 pre-
formatted disks available to proceed.)  [y/n, default n]:
```

Write down the number of bytes that the cpio archive will require. You will need this number later when you are restoring files.

Enter n if you do not want to make a backup at this time or if you do not have the required number of formatted 3.5-inch disks. This quits the bakchk program. You can examine the /bakchk.report file and use this file later as an input file to cpio if you wish.

Enter y if you want to make a backup at this time and if you have the required number of formatted 3.5-inch disks.

4. Insert a formatted 3.5-inch disk into drive 0 when prompted.

The `bakchk` program displays this message

```
Waiting for floppy
```

and waits for you to insert a 3.5-inch disk into drive 0. Label and number each disk with a sequential number, starting with 1. *It is very important that you correctly label each disk.*

Continue removing and inserting disks as prompted by `bakchk`.

5. Reinsert the backup disks for verification.

After the backup has been made, you will see the messages

```
xxxx blocks
The archive has been written.  Please re-insert the disk(s)
for verification of readability.
```

Reinsert the 3.5-inch disks one by one, starting with disk 1. Ignore the message

```
can't read input - errno=25: Not a typewriter
```

if it appears.

The `bakchk` program concludes when you see the message

```
xxxx blocks
```

Remove the last 3.5-inch disk and store your backup disks in a safe place.

6. Print a copy of the `/bakchk.report` file.

Print a copy of the `/bakchk.report` file for future reference. Enter multi-user mode using the `init 2` command, log in as `root`, print your file using the `lp` command, and then enter `shutdown` to return to single-user mode. Store the printed copy of `/bakchk.report` with the 3.5-inch disks that you have just saved your files on. Having this list available will help you later when you restore files.

7. Power down your A/UX system.

From single-user mode, use this sequence to turn off your computer:

```
sync
sync
sync
powerdown
```

The next steps you take are performed in the Macintosh OS.

Go to the next section, "Preparing the Macintosh Partition," to continue the software setup.

Preparing the Macintosh Partition

Before you install A/UX, you need to prepare the Macintosh partition of the disk you are going to install A/UX on. You need to perform three tasks:

- Install the System Folder on the SASH Partition.
- Copy the `sash` application and utilities to the SASH Partition.
- Set your startup device and application.

The following sections help you accomplish these goals.

The steps given here are necessary only if you are installing or updating A/UX from a cartridge tape or from 3.5-inch disks. If you have an internal or external hard disk that has A/UX factory-installed, skip this section and go to Chapter 5, "Getting Ready to Run A/UX 1.1."

Installing the System Folder

This section shows you how to set up your System Folder on your A/UX disk using the Installer found on the *System Setup and ReadMe* disk. The System Folder contains resources, such as those necessary for printing, along with desk accessories and other system resources. The resources in your System Folder on your A/UX disk are accessible from the Macintosh OS and when you are running `sash`.

Before you install A/UX on your hard disk for the first time, you must have initialized your hard disk as described in "Preparing Your Hard Disk" or you must be updating an earlier release of A/UX.

What you need now

You use the Installer to install Macintosh system resources on your hard disk labeled SASH Partition. If you are updating to A/UX 1.1 have the following disk ready:

- *System Setup and ReadMe,* a 3.5-inch disk

This disk is found in your A/UX accessory kit.

Using the Installer

If you are installing A/UX 1.1 on a newly initialized disk, you should see the System Setup and ReadMe window as shown in Figure 3-11. If you see this on your screen, go to step 3.

Follow these steps to install the Macintosh System Folder:

1. **Insert the disk labeled *System Setup and ReadMe* into the 3.5-inch disk drive.**

   If you have two 3.5-inch disk drives, use the drive on the right.

2. **Start up your computer using *System Setup and ReadMe* as your startup disk.**

   If your system isn't already on, turn it on now by pressing the POWER ON key.

   If your system is already on, select Restart from the Special menu. When the system ejects the *System Setup and ReadMe* disk, *immediately reinsert the disk.*

   Your computer will start up from the *System Setup and ReadMe* disk. After a few moments you should see the System Setup and ReadMe window on your screen, as shown in Figure 3-11. If you do not see the System Setup and ReadMe window, you should see an icon labeled System Setup and ReadMe. Double-click the icon to see the System Setup and ReadMe window.

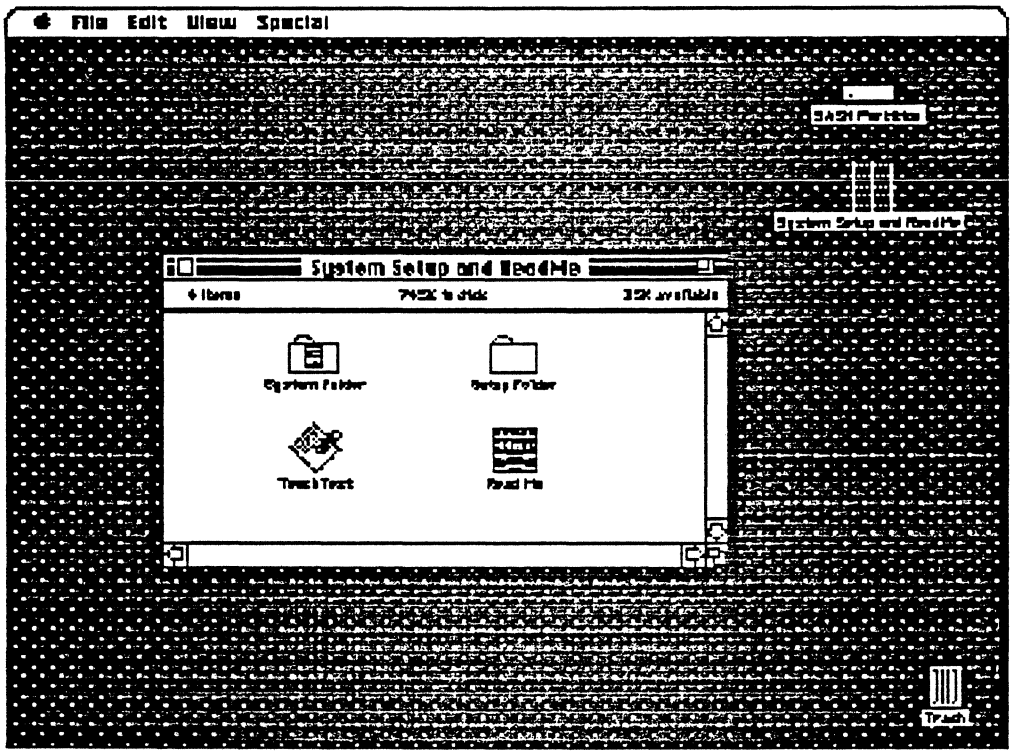

Figure 3-11
The System Setup and ReadMe window

3. Open the SetUp Folder.

Double-click the SetUp Folder icon. You should see the contents of the SetUp Folder as shown in Figure 3-12.

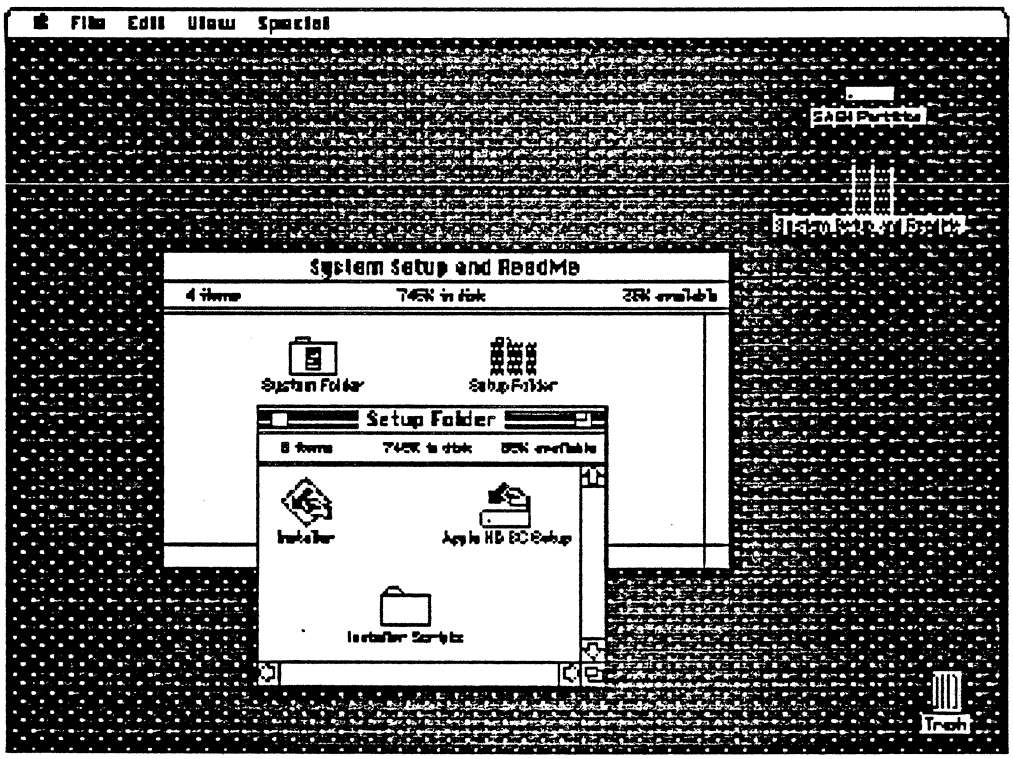

Figure 3-12
Contents of the SetUp Folder

4. Open the Installer.

Double-click the Installer icon to open the Installer. You should see a display of your installer options as shown in Figure 3-13.

Make sure that the name of the hard disk you want to install on shows above the Eject and Drive buttons. If this is not the correct name, click on Drive until the correct hard disk is displayed.

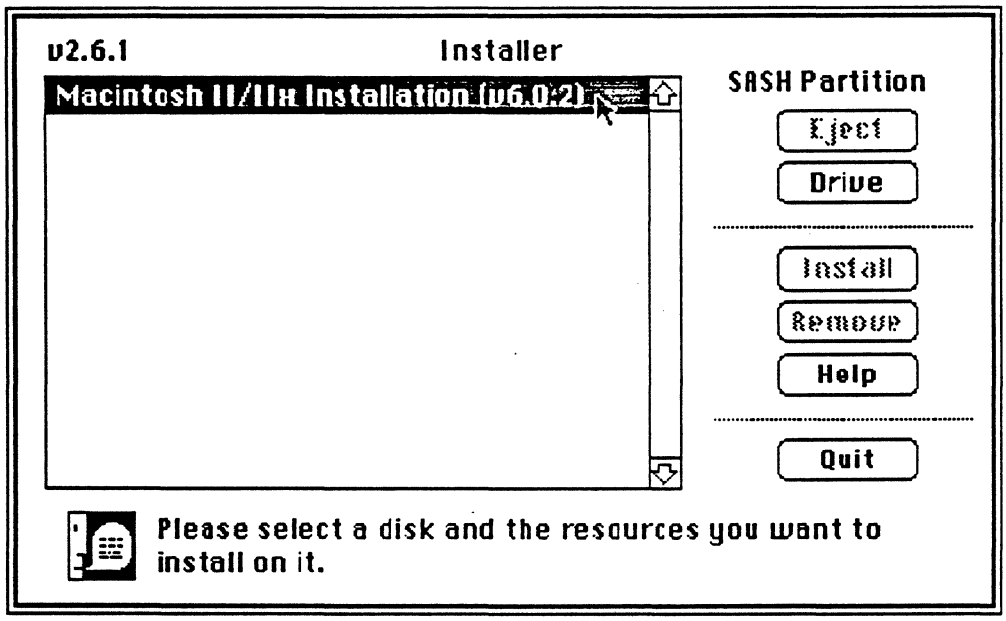

Figure 3-13
Installer options

5. Click `Macintosh II/IIx (v6.02)`.

In a few moments you should see a message telling you how much space will be left on your Macintosh partition after installation.

6. Click Install.

Installation takes about half a minute. At the end of installation you will see a message telling you that installation on the SASH Partition was successful.

❖ *Note:* Only a small set of desk accessories are installed. You can use Font/DA Mover later to install more desk accessories. After you finish installing A/UX, see *Macintosh Utilitites User's Guide* for information on installing other desk accessories.

7. Click Quit.

You are returned to the Macintosh Finder.

❖ *If you are updating to A/UX 1.1:* When you perform step 8, be sure to stop the automatic boot by clicking Cancel when you see the automatic startup screen.

8. Choose Restart from the Special menu.

When you choose Restart, the system ejects the 3.5-inch disk from the disk drive; you can now remove the disk. Your computer restarts from a hard drive that contains a System Folder. You should now see the Finder (unless you're updating your system, in which case you might not see the Finder right now). If you are updating and you see the automatic countdown screen, click Cancel, then choose Quit from the File menu. If you are updating and you see the Stand-Alone Shell window, choose Quit from the File menu.

Now go to the next section to continue with the software setup for A/UX.

Copying `sash` and utilities to the SASH Partition

Before beginning the installation process, you need to copy a few programs from the *A/UX `sash` and Utilities* disk to the hard disk labeled SASH Partition. You need to perform the steps listed in this section only if you are installing or updating A/UX from the A/UX Tape or Floppy Product.

What you need now

Have the following 3.5-inch disk available:

- ☐ *A/UX `sash` and Utilities,* a disk that contains a stand-alone A/UX shell, a Macintosh OS System Folder, and stand-alone versions of some key A/UX utilities.

Copying `sash` to the SASH Partition

Use the 3.5-inch disk *A/UX `sash` and Utilities* to copy `sash`, the `bin` folder, and the `kermit` folder to your SASH Partition disk. Always use disk drive 0 (which is usually the drive on the right, if your computer has more than one).

Follow these steps to copy `sash` to the SASH Partition.

1. Insert the disk labeled *A/UX `sash` and Utilities* into the 3.5-inch disk drive.

You should see a window showing the contents of the disk as shown in Figure 3-14. If you do not see this window, double-click the disk icon labeled A/UX `sash` and Utilities.

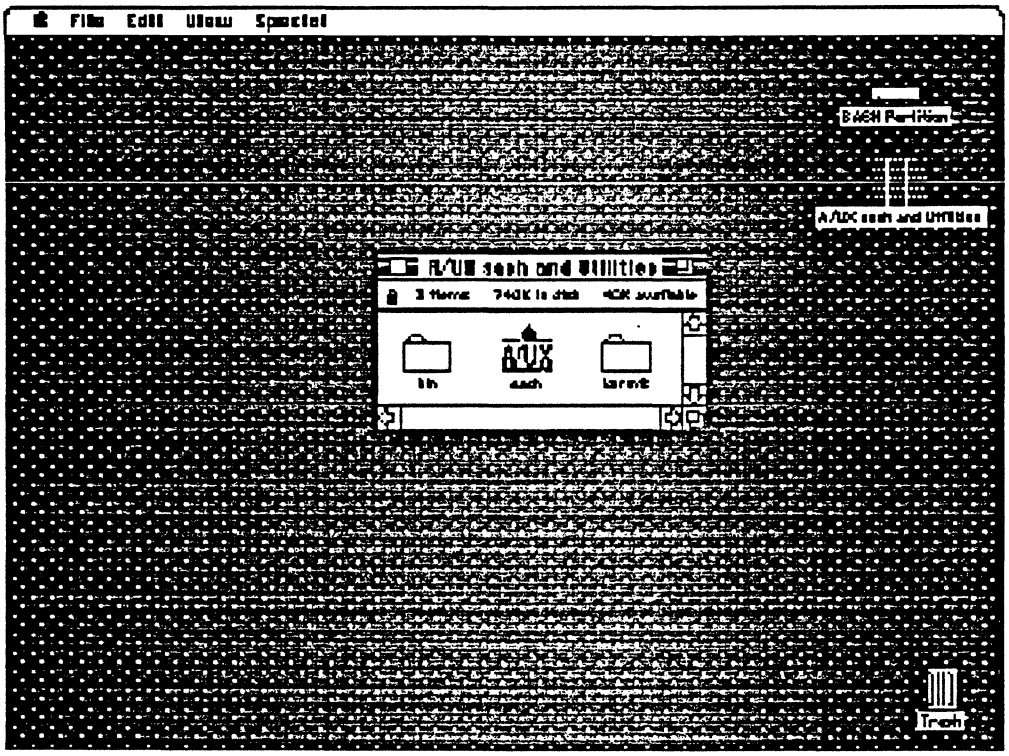

Figure 3-14
The A/UX `sash` and Utilities window

2. Choose Select All from the Edit menu.

All three icons in the window are highlighted.

3. Drag the selected icons to the SASH partition icon.

Point to any of the three icons. Press and hold down the mouse button while you drag the icons onto the SASH Partition icon. Release the mouse button when the SASH Partition icon is highlighted.

Status messages report on the progress of the copy.

If you are updating your current A/UX system to A/UX Release 1.1, you will see the dialog box shown in Figure 3-15. Click OK to replace your current A/UX `sash` and utilities with those of the new release.

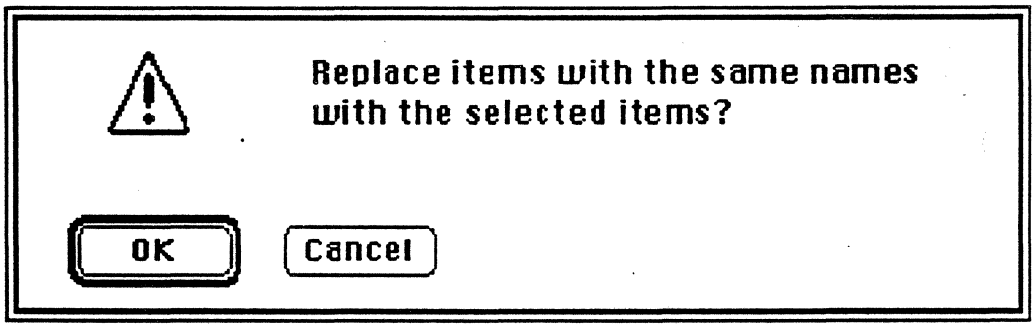

Figure 3-15
The replace alert box

4. Eject the *A/UX sash and Utilities* disk.

Eject the *A/UX sash and Utilities* disk from the drive by choosing Eject from the File menu. Remove the *A/UX sash and Utilities* disk and put it in a safe place.

You are almost ready to begin installing A/UX. First make final preparations by following the directions in the next section, "Setting the Startup Device and Application."

Setting the startup device and application

As final prepartation before installing A/UX, you must

- set the startup device
- set the startup application

Setting the startup device

When you switch on the Macintosh, it follows a specified order when it scans for a System file.

1. Internal 3.5-inch disk drive or drives. If you have two disk drives, it looks first at the drive on the right (drive 0).
2. Internal hard disk.
3. External SCSI hard disk with the highest ID number.
4. External hard disk with the next highest ID number.

You use the Control Panel desk accessory to override the scanning sequence during startup. You should designate the hard disk with A/UX on it as your startup disk. You can change this order later if you like.

Follow these steps to set the startup device:

1. Choose Control Panel from the Apple menu.

- Place the cursor on the Apple menu and press the mouse button to open it.
- Drag the cursor until Control Panel is highlighted.
- Release the mouse button.

The Control Panel dialog box appears, as shown in Figure 3-16.

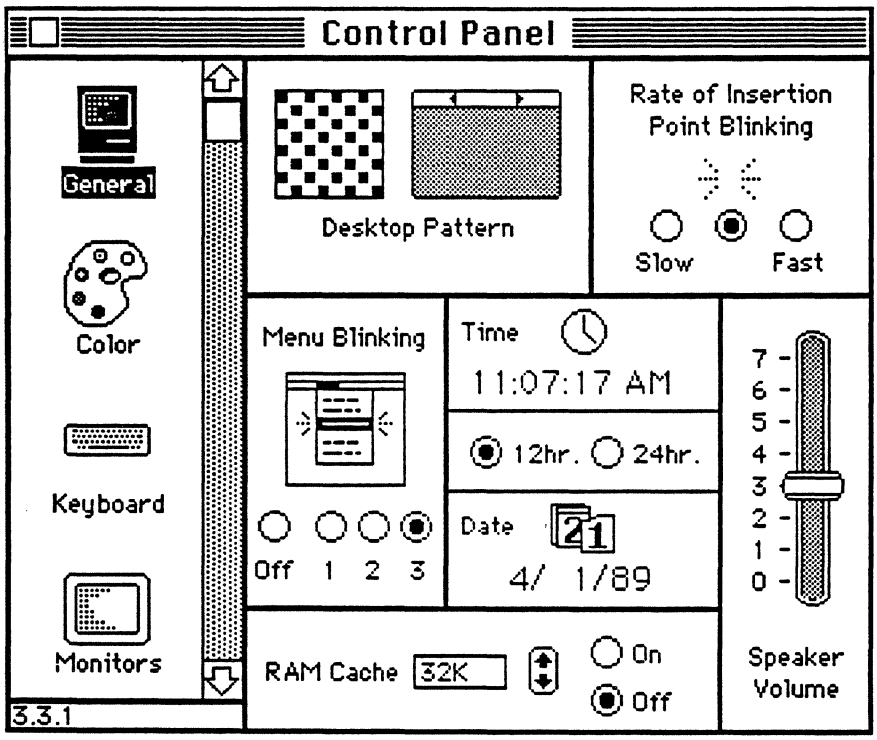

Figure 3-16
The Control Panel dialog box

2. Click the Startup Device icon.

If necessary, use the scroll bar to bring the Startup Device icon into view.

3. Click the SASH Partition icon.

The icon should become highlighted as shown in Figure 3-17. When you start your computer, the system uses that hard disk as the startup disk (unless you have inserted a 3.5-inch disk that contains a System Folder).

4. Close the Control Panel.

Click the Close box (on the left corner of the Control Panel title bar) or choose Close from the File menu.

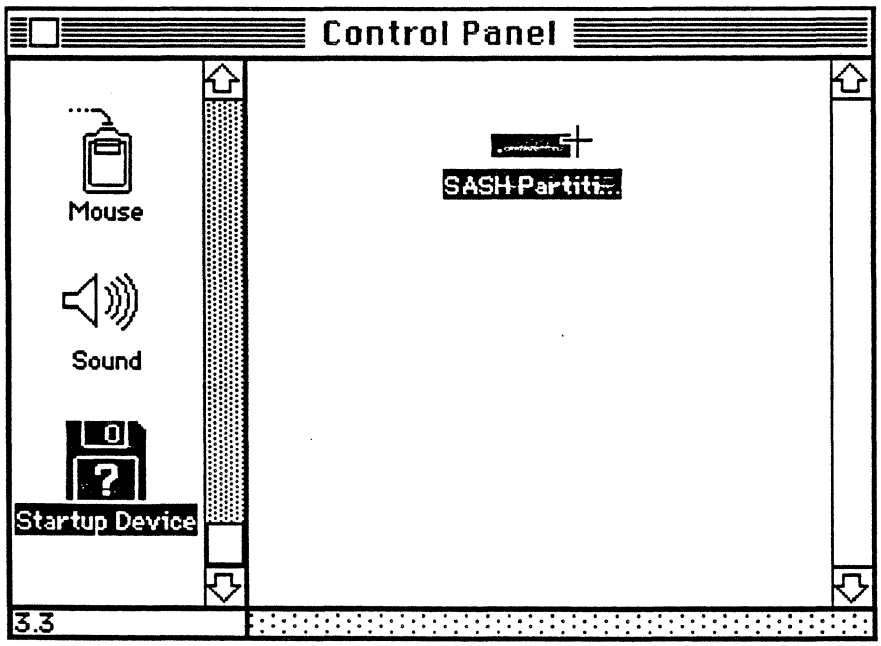

Figure 3-17
Setting the startup device from the Control Panel

Setting `sash` as the startup application

Follow these steps to set the startup application:

1. **Double-click the SASH Partition icon to open it.**

   The SASH Partition window appears, showing the contents of the disk.

2. **Click the `sash` application icon to select it.**

   The icon should become highlighted, as shown in Figure 3-18.

3. **Choose Set Startup from the Special menu.**

   The Set Startup dialog box appears, as shown in Figure 3-19. The radio button next to `sash` is selected to designate it as the startup application.

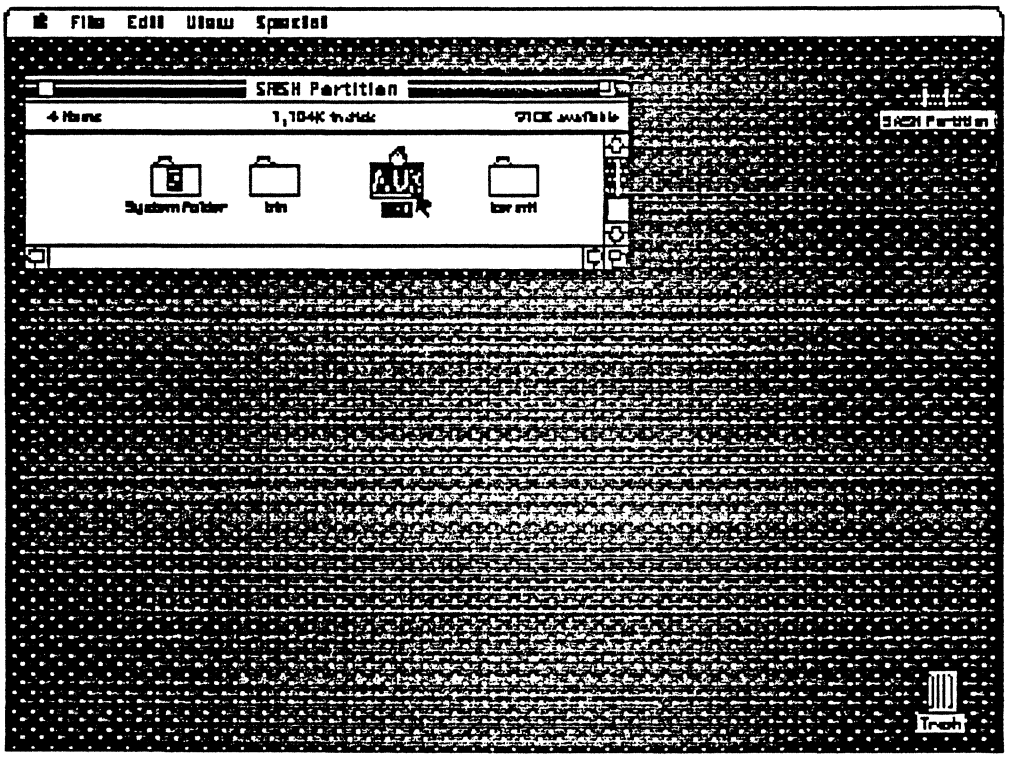

Figure 3-18
The `sash` icon selected

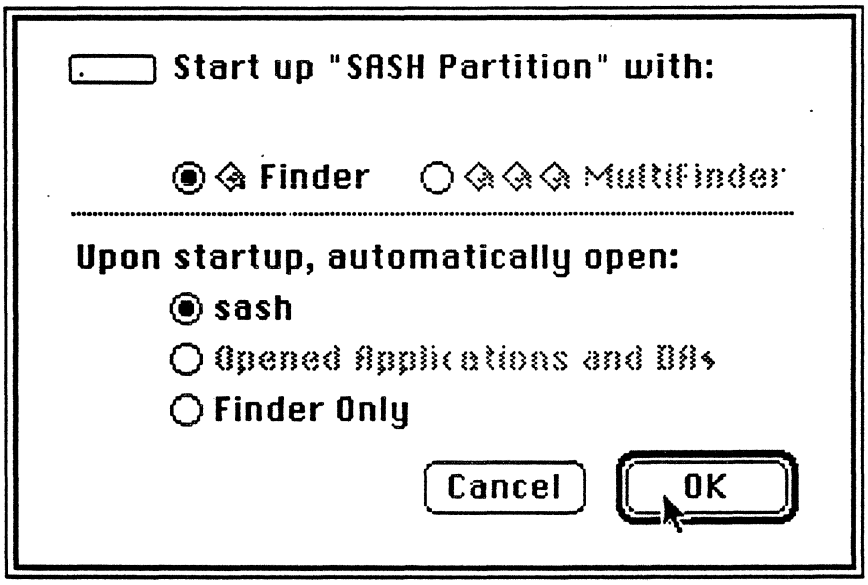

Figure 3-19
The Set Startup dialog box

Important

Do not start up the SASH Partition with MultiFinder. If the radio button next to MultiFinder is checked, then click the radio button next to Finder to start up the SASH Partition with the Finder.

---

4. Select the Finder and sash radio buttons.

This action sets your computer to run the Finder and immediately start up `sash` when you start or restart your system.

5. Click OK.

This records your changes and closes the dialog box.

6. Close the SASH Partition window.

Click the box in the top left corner of the SASH Partition window to close it.

Now you are ready to install A/UX. Go on to Chapter 4, "Installing from Tape or Floppy Product" to begin the installation process.

Chapter 4

Installing From the Tape or Floppy Product

This chapter describes how to install A/UX Release 1.1 software and how to update A/UX 1.0 to A/UX 1.1 using the A/UX Tape Product or Floppy Product.

- If you are *installing A/UX on a new hard disk,* you perform the procedures in this chapter after you have prepared the hard disk, installed the System Folder, and copied `sash` and utilities to the SASH Partition, as described in Chapter 3.
- If you are *updating your current system to A/UX 1.1,* you perform the procedures in this chapter after you have backed up your system, run the `syschk` program, installed the System Folder, copied `sash` and utilities to the SASH Partition, and set the startup device and application, as described in Chapter 3.
- If you are *configuring A/UX from a factory-installed hard disk,* skip this entire chapter and go to Chapter 5, "Getting Ready to Run A/UX 1.1."

There are two kinds of installation: standard and nonstandard. This chapter explains only the standard installation, which meets the requirements of most users. When you perform a standard installation, all A/UX files, including the autorecovery partitions, are copied onto the same hard disk (internal or external). If you are new to A/UX, you should do a standard installation.

A nonstandard installation allows you several options. Before continuing with the installation, if you are an expert user, you may want to determine if any of these options apply to your installation. Your choices are

- to place the root files and the `/usr` file system on separate disks
- to omit filling the autorecovery partitions

If you want to perform a nonstandard installation, follow the directions in Appendix B, "Nonstandard Procedures."

An overview of software installation

The A/UX Tape Product consists of a set of 3.5-inch disks containing the tools necessary to install the A/UX software on a hard disk and a single streaming tape cartridge containing the A/UX software. The A/UX Floppy Product consists of the same set of tools and A/UX software, entirely on 3.5-inch disks.

Installing the A/UX software from tape or 3.5-inch disks is done in two phases: an initial phase and an installation phase. Figure 4-1 illustrates this two-phase installation process.

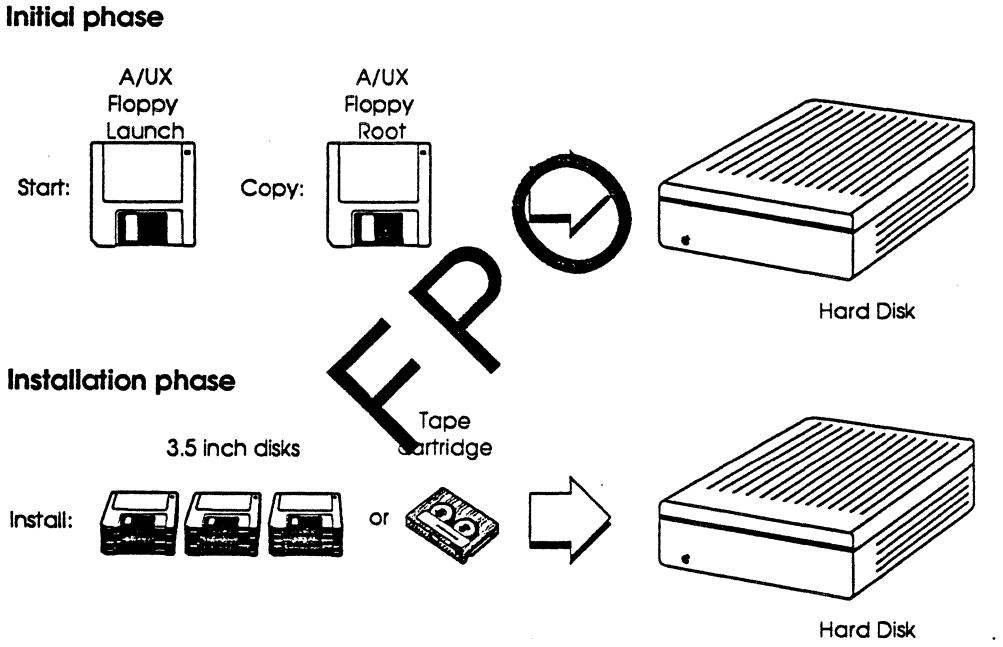

Figure 4-1
The installation process

- In the initial phase you specify whether you will install from tape or disks and whether you will perform a standard or nonstandard installation and you provide SCSI identification number or numbers. You then start the first part of the installation process, which copies root files onto your hard disk. This phase takes about 20 minutes.
- In the installation phase you copy the rest of the A/UX software onto the hard disk. If you are installing from tape, this phase requires about 75 to 80 minutes for a complete installation, and once begun it can proceed unattended. If you are installing from 3.5-inch disks, this phase requires about two hours for a complete installation, and it requires someone to insert disks during the process.

If you are installing from tape, follow the installation procedures in "Launching the Installation Process" and "Installing from Tape Cartridge." If you are installing from 3.5-inch disks, follow the installation procedures in "Launching the Installation Process" and "Installing from 3.5-inch Disks."

What you need now

Before you begin, you must have prepared your hard disk by following the procedures in Chapter 3, "Organizing Your Hard Disk." You must know the SCSI ID number of the hard disk on which you will install the system. If you are installing from tape, you must also have connected your Tape Backup 40SC unit to your system as described in "Adding SCSI Devices" in Chapter 1. You also need to know the SCSI ID number for the tape drive.

Have the following items available for the initial phase:

- *A/UX Floppy Launch,* a disk that contains a special stand-alone A/UX shell, a kernel, and a few utilities.
- *A/UX Floppy Root,* a disk that contains a mountable A/UX file system. This disk is not readable from the Macintosh OS.

Have *either* of the following items available for the appropriate installation phase:

- If you purchased the A/UX Tape Product, the streaming tape cartridge labeled *A/UX Installation Tape Cartridge* that contains the complete A/UX file system.
- If you purchased the A/UX Floppy Product, a set of 3.5-inch disks that contain the A/UX software, labeled *A/UX Installation Disk 1* through *A/UX Installation Disk 26,* followed by an index disk labeled *File Index.*

Launching the installation process

In this initial phase you will use the 3.5-inch disks *A/UX Floppy Launch* and *A/UX Floppy Root* to begin the installation process. If you receive an error message anytime during installation, refer to Appendix A, "Troubleshooting."

Follow these steps to begin the installation process:

1. Insert *A/UX Floppy Launch* into the 3.5-inch disk drive.

Always use 3.5-inch disk drive 0 (which is usually the drive on the right, if your system has more than one). You should see the A/UX Floppy Launch window shown in Figure 4-2. If you do not see this on your screen, double-click the A/UX Floppy Launch disk icon.

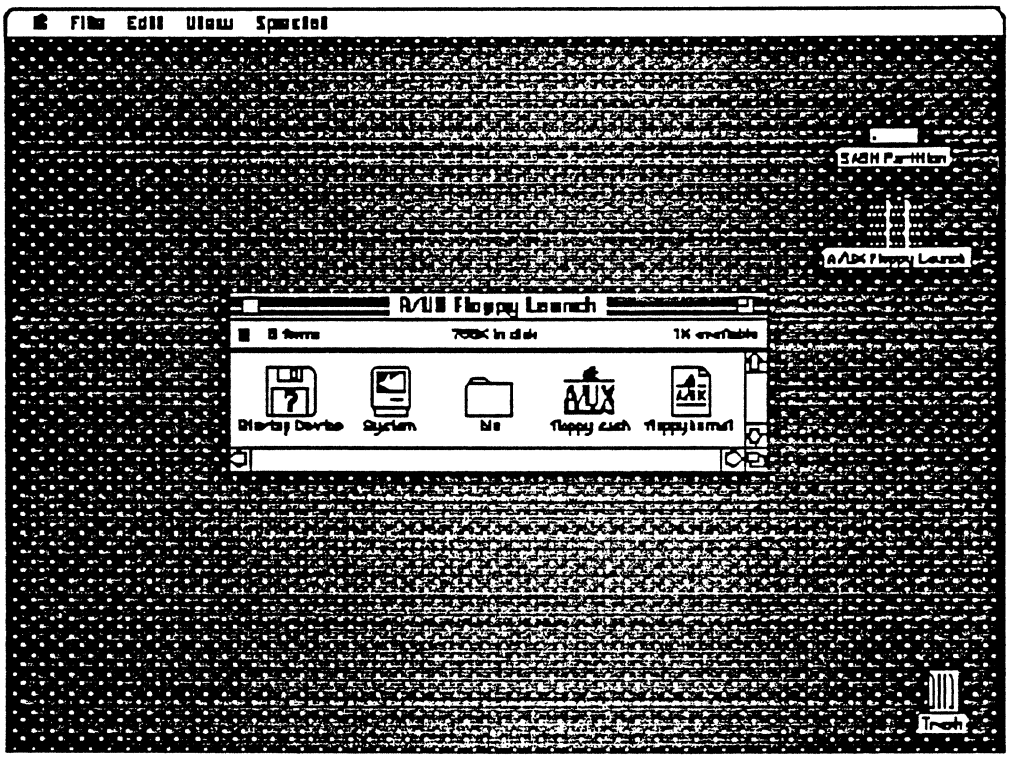

Figure 4-2
The A/UX Floppy Launch window

Important

Start up the `floppy sash` application on the 3.5-inch disk. Do not start up the `sash` application on the hard disk.

2. Double-click the `floppy sash` application icon.

Double-click the `floppy sash` application icon in the A/UX Floppy Launch window. Figure 4-3 illustrates the `floppy sash` application icon.

Figure 4-3
The `floppy sash` icon

The `floppy sash` Stand-Alone Shell window appears, as shown in Figure 4-4. Ignore the message `chroot failed` if it appears. Also ignore the message `Disk c0d0s0 Error: Cannot select SCSI device ...` if it appears. Verify that the next line reads `floppy sash#`. If the word *floppy* is not there, choose Quit from the File menu and return to step 1 of this section.

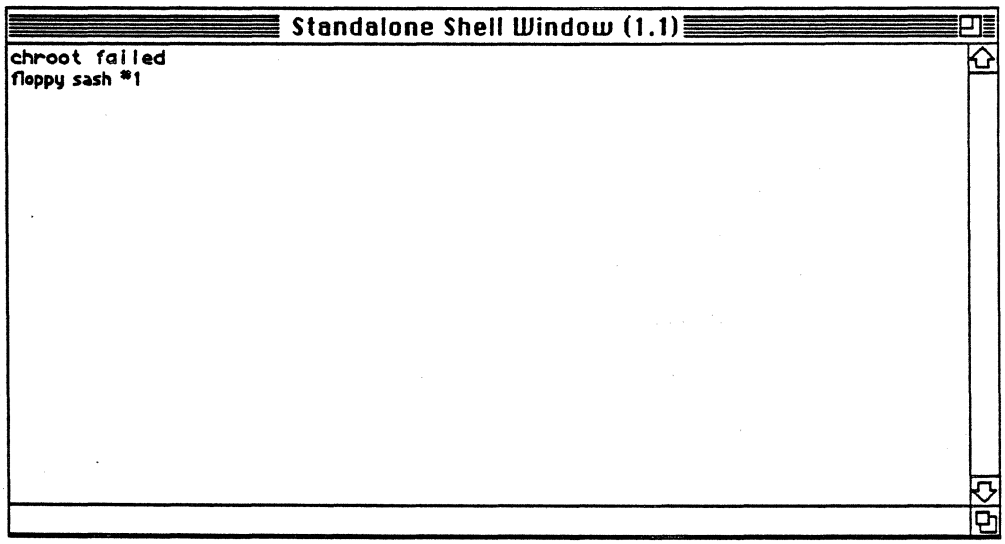

Figure 4-4
The `floppy sash` Stand-Alone Shell window

3. Launch the installation procedure.

Do either of the following:

- Choose AutoLaunch from the Execute Menu.
- Enter (at the prompt `floppy sash#`)

```
autolaunch
```

The system reads information from the 3.5-inch disk. After a few moments, a box appears with a message like

```
Ready to Launch A/UX

Please insert a diskette with an A/UX
filesystem on it.
```

and the system ejects the *A/UX Floppy Launch* disk.

4. Remove the *A/UX Floppy Launch* disk.

Remove the *A/UX Floppy Launch* disk now and store it in a safe place.

5. Insert the *A/UX Floppy Root* disk into disk drive 0.

Important

This disk must be writable. If the disk has been physically locked to protect the data, unlock it by sliding the colored tab away from the edge of the disk. When the disk is writable, the tab covers the hole in the disk.

The system boots A/UX from the 3.5-inch disk. The screen flashes once and you see the A/UX Initial Console Emulator window. You will see messages displaying copyright and release ID information.

6. After reading system messages, press RETURN to continue.

The screen displays a variety of information. After a short while, the screen displays some messages regarding the assumptions made about your installation. You should see messages on your screen like

```
erase is DELETE
Welcome to the A/UX Release 1.1 installation procedure.
This procedure assumes the following:
  * You have an Apple HD 80SC (or equivalent) hard disk
    attached to the system and turned on.
  * Your hard disk has previously been initialized and
    partitioned for A/UX (as by using the Apple HD SC Setup
    utility).
  * You plan to install all files in the root file system
    (possibly excluding /usr) at this time. (Use cpio(1) to
    add only selected files.)
  * If you are installing from tape, you have an Apple Tape
    Backup 40SC unit attached to the system and turned on.
  * Optional: If you are updating an existing A/UX system to
    release 1.1, you should have run the syschk utility to
    produce a report of the system files you have
    personalized on your file system. You should also have
    backed up these files as appropriate.
If your system does not match these assumptions, or if you
have any questions, enter q to quit now and refer to the A/UX
Installation Guide for more information.
Otherwise press RETURN to begin the installation [q to quit]:
```

The message `erase is DELETE` reminds you that during the following installation procedures, you can use the DELETE key to correct your typing as long as you have not pressed RETURN.

❖ *Note:* Any time you are given a prompt on the screen you can enter `q` to quit from the installation procedure. If you do so, however, you will have to restart the installation procedures with step 1 of this section. If you choose to quit, the system exits the installation procedures and shuts down the system.

- ☐ Enter `q` if you are not prepared to proceed with the installation procedure.
- ☐ Press RETURN if you are ready to proceed.

7. Press RETURN to choose standard installation.

You will see a message like

```
By default, this program will use the standard A/UX
configuration for installing files.  That is, all files
will be installed onto a single hard disk partition, and
autorecovery partitions will be filled.  If you wish to use
a separate file system for /usr, or do not wish to make use
of autorecovery, you must choose the non-standard
configuration.

Do you wish to accept the standard A/UX configuration?

[y/n, default=y]
```

Enter `y` or press RETURN to accept the standard configuration. In the standard configuration, the `/usr` directory is in the root file system, and disk space is allocated for copies of files to be used in `autorecovery`.

❖ *Note:* Information on nonstandard installation is given in Appendix B, "Nonstandard Procedures." Do not enter `n` without having read that information.

8. Specify whether you will install from tape or disks.

You will see a message like

```
If you will be installing A/UX Release 1.1 from floppies,
please enter 'F' at the prompt.  If you will be installing
from tape, please enter 'T'
```

Enter `T` or `F` if you are installing from tape or 3.5-inch disks, respectively. If you are installing from 3.5-inch disks, go to step 10.

9. If you are installing from tape, enter the SCSI ID number of the tape drive unit.

You will see a message like

```
Please enter the SCSI ID number of your tape drive [0-6]:
```

❖ *Note:* Your Tape Backup 40SC should be on when you answer this prompt. If you have not already powered on your tape device, do so now.

Enter the SCSI ID number assigned to your tape unit, the Tape Backup 40SC. (Normally the number is 1. You can check by looking at the back of the unit.) *It is very important to enter the correct number.*

10. Enter the SCSI ID number of the hard disk on which you are installing the A/UX software.

You will see a message like

```
Please enter the SCSI ID number of the disk onto which you
will be installing A/UX [0-6]:
```

Enter the SCSI ID number assigned to the hard disk on which you will install A/UX. The internal drive is set to 0 as shipped. If you are installing on an external hard disk, the number is set to 5 as shipped. If you have more than one SCSI device, make sure that each SCSI device has a unique SCSI ID number. Verify the SCSI ID numbers of all your SCSI devices by checking the SCSI ID indication at the back of the device. *It is very important to enter the correct number.*

11. Confirm the SCSI ID number or numbers.

If you specified tape installation, you will see a message like

```
Please verify and confirm the following:
 Tape drive is SCSI ID m
 A/UX will be installed onto hard disk SCSI ID n
Enter y to confirm, n to change, q to quit:
```

If you specified 3.5-inch disk installation, you are queried only about the hard disk SCSI ID number.

- Enter `q` if you are not prepared to proceed with the installation procedure.
- Enter `n` if the SCSI ID number or numbers are incorrect. You will be prompted to reenter the SCSI ID number or numbers.
- Enter `y` if the SCSI ID number or numbers are correct.

  The system now performs initial checks before installation. It performs various preliminary tests to ensure that the hard disk is available, has sufficient space, and has a valid file system. You may be asked to respond during these events if the system has problems or finds unexpected information present.

If you are installing on a hard disk that has been initialized and partitioned (using the procedures in "Preparing the Hard Disk"), go to step 12. If you are installing over an existing system (doing an update or reinstalling for some reason), go to step 13.

❖ *Note:* If you are installing on a disk that has been used for A/UX and has been repartitioned, but not reinitialized, you may get the message shown in step 13.

12. Complete the appropriate steps if you are installing onto a newly initialized hard disk.

If the disk has been recently initialized and partitioned, you will see a message like

```
*****   ATTENTION   *****

Your hard disk does not contain a valid A/UX root file
system.  In order to install A/UX, it will be necessary to
make a new file system.

WARNING: Creation of a file system will destroy any A/UX
data which might be on your disk.  If you suspect that
there may be useful data on this disk, DO NOT make a new
file system.  Enter q to quit now and get help.

This procedure will NOT harm your Macintosh partition.

Should a new file system be created? [y/q]
```

This is the beginning of the installation procedure. You can continue if you are ready to create a new file system and begin the installation or quit if you want to restart the installation process later.

- Enter `q` if you do not want to create a new file system at this time. This exits the installation procedure.
- Enter `y` to create a new file system. You will see the message

  ```
  Making and mounting root file system ...
  ```

  After a few moments, you will see the message

  ```
  Ready to install critical root files onto your hard disk.
  Please wait ...
  ```

  The system now copies the root files from the *A/UX Floppy Root* disk. This process takes 5 to 7 minutes. After successful transfer of the root file system you will see the message

  ```
  Preparing to reboot from your hard disk ... Done.
  ```

  Your system now reboots. Your screen flashes, the smiling Macintosh icon appears, and the *A/UX Floppy Root* disk is ejected. Remove the disk and put it in a safe place. You should now see the Stand-Alone Shell window again. If you do not see the Stand-Alone Shell window, see Appendix A, "Troubleshooting."

- If you are installing A/UX on a hard disk with SCSI ID number 0, proceed with the installation by typing `autolaunch` at the `sash#` prompt. A message about Phase II of the installation will appear. Proceed to "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."
- If you are installing A/UX on a hard disk other than SCSI ID number 0 or if you see the message `chroot failed`, you must change the boot disk as described in "Setting the Boot Device." Go to "Setting the Boot Device" now and then proceed to either "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

13. Complete the appropriate steps if you are updating a previously used disk.

If you have previously used your disk for A/UX and you are doing an update, a root file system already exists. Or if you have previously attempted an installation, a root file system may be left over from that attempt. (You may also get this message if you have repartitioned a disk previously used for A/UX without having reinitialized it.) When the installation procedure detects the presence of a root file system, you see a warning message like

```
Your disk appears to contain a valid A/UX file System.
Under normal conditions, this disk should be mounted to
continue the installation.

HOWEVER: If you have any doubts about the validity of this
file system (i.e. fsck and/or autorecovery have been
unable to repair your system), you should not use this
file system (but make a new one).

OK to use the existing file system? [y/n]
```

This message indicates that a root file system exists on your disk. If you did not know there was an A/UX file system on this disk, you should first verify that you are installing on the correct disk. In this case, enter `q` to exit the installation procedure.

If you are updating a previous A/UX release to A/UX 1.1, you should be able to use the existing file system. You should consider making a new file system only if you are not sure that the existing file system is valid.

You have two choices: to use the existing file system or to not use the existing file system. Both choices are described next.

■ **Enter `y` if you want to use the existing file system and update its contents.**

If you are doing an update, you will overwrite the existing A/UX system files. (Your user files remain intact; not everything is replaced or overwritten.)

After entering `y`, you will see the message

```
Ready to install critical root files onto your hard disk
```

You will then see an additional message

```
*****   WARNING   *****

This procedure WILL OVERWRITE certain critical system files
in the root file system with their initial (installation)
values.

If this is not acceptable, enter q to quit now.
Otherwise press RETURN to install these root files [q to
quit]:
```

This is the beginning of the installation procedure. If you proceed past this point, any existing system files on the disk will be replaced. You can continue if you are ready to install or quit if you want to start the installation process over at a later time.

- Enter `q` if you want to exit from the installation procedure.
- Press RETURN to update your system files. You will see the message

  ```
  Please wait ...
  ```

  The system now copies the root files from the *A/UX Floppy Root* disk. This process takes 5 to 7 minutes. After successful transfer of the root file system you will see the message

  ```
  Preparing to reboot from your hard disk ... Done
  ```

  The system now reboots. Your screen flashes, the smiling Macintosh icon appears, and the *A/UX Floppy Root* disk is ejected. Remove the disk and put it in a safe place. You should see the Stand-Alone Shell window again. If you do not see the Stand-Alone Shell window, see Appendix A, "Troubleshooting."
- If you are installing A/UX on a hard disk with SCSI ID number 0, proceed with the installation by entering `autolaunch` at the `sash#` prompt. A message about Phase II of the installation will appear. Proceed to "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."
- If you are installing A/UX on a hard disk other than SCSI ID number 0 or if you see the message `chroot failed`, you must change the boot disk as described in the next section "Setting the Boot Device." Go to "Setting the Boot Device" now and then proceed to either "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

■ **Enter n only if you want to overwrite the existing file system.**

You should enter n only if you want to remake the existing file system. This will overwrite the existing file system and replace it with the new file system. If you are updating your previous A/UX system, you should not enter n unless you realize that doing so will overwrite all files on your hard disk.

If you have repartitioned your old system, you may get this message because the installation procedure detects part of the leftover, invalid file system. In this case the existing file system is not complete. Enter n to make a new, valid file system.

After entering n, you will see the message

```
WARNING: Creation of a file system will destroy any A/UX
data which might be on your disk.  If you suspect that
there may be useful data on this disk, DO NOT make a new
file system.  Enter q to quit and get help.

This procedure will NOT harm your Macintosh partition.

Should a new file system be created? [y/q]
```

- Enter q if you do not want to create a new file system at this time. This exits you from the installation procedure.
- Enter y to create a new file system. You will see the message

```
Making and mounting root file system
```

After a few moments you will see the message

```
Ready to install critical root files onto your hard disk.
Please wait ...
```

The system now copies the root files from the *A/UX Floppy Root* disk. This process takes 5 to 7 minutes. After successful transfer of the root file system you see the message

```
Preparing to reboot from your hard disk ... Done.
```

The system now reboots. Your screen flashes, the smiling Macintosh icon appears, and the *A/UX Floppy Root* disk is ejected. Remove the disk and put it in a safe place. You should see the Stand-Alone Shell window again. If you do not see the Stand-Alone Shell window, see Appendix A, "Troubleshooting."

- If you are installing A/UX on a hard disk with SCSI ID number 0, proceed with the installation by entering `autolaunch` at the `sash#` prompt. A message about Phase II of the installation will appear. Proceed to "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."
- If you are installing A/UX on a hard disk other than SCSI ID number 0 or if you see the message `chroot failed`, you must change the boot disk as described in "Setting the Boot Device," given next.

Setting the boot device

If you are installing A/UX on a hard disk other than SCSI ID 0, you must set the correct SCSI ID you want to boot from before continuing with installation. (If you are installing on SCSI ID 0, you can skip this step and go on to either "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks.")

Follow these steps to set the SCSI ID number of the device on which you are installing A/UX.

1. Choose General from the Preferences menu.

Place the pointer on Preferences in the menu bar at the top of the screen. Press the mouse button so that Preferences is highlighted. Drag down until the General command is highlighted, as shown in Figure 4-5. Then, release the mouse button.

The General dialog box appears, as shown in Figure 4-6.

2. Change the SCSI ID parameter in the RootDirectory box.

You use the RootDirectory box to identify the disk from which `sash` starts A/UX. This box contains three parameters. The first parameter identifies the SCSI ID number of the disk that contains the startup files. This parameter is set to 0 by default for installation from tape or 3.5-inch disks.

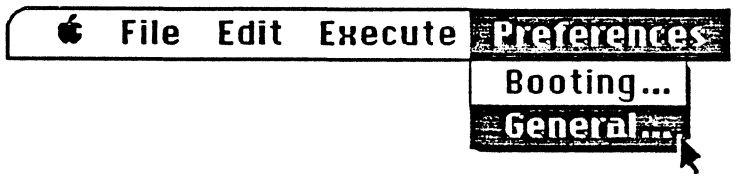

Figure 4-5
Choosing General

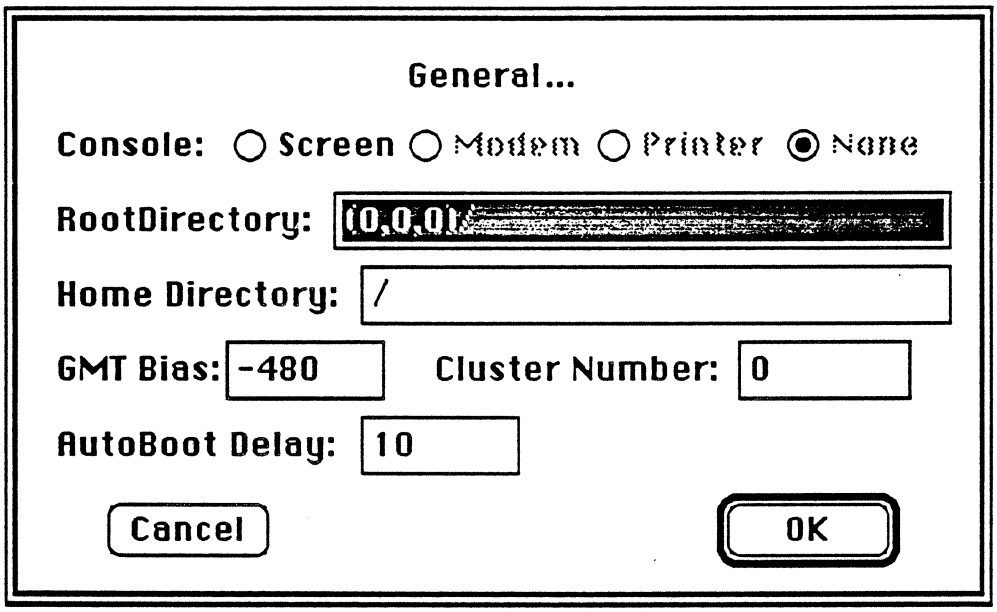

Figure 4-6
The General dialog box

To change the SCSI ID number, select the first 0 in the RootDirectory box by dragging, as shown in Figure 4-7. Type the SCSI ID number of the hard disk on which you are installing A/UX.

For information about other RootDirectory parameters, see *A/UX Local System Administration*.

3. Click OK.

Click OK to accept your changes.

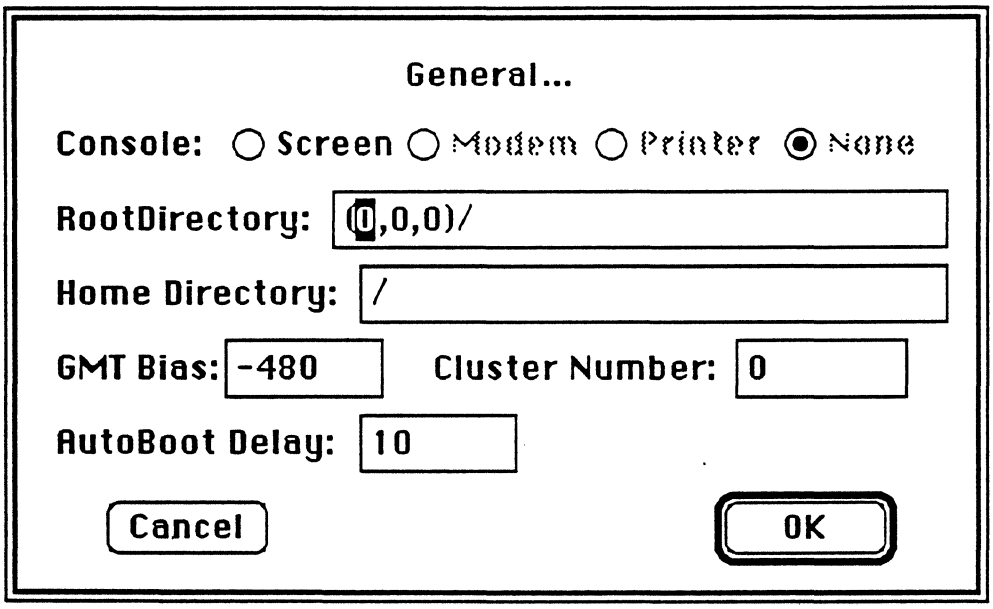

Figure 4-7
Changing the SCSI ID number

4. Choose Restart from the Execute menu.

You must choose Restart from the Execute menu for the changes you just made to take effect. The system restarts and you will again see the Stand-Alone Shell window.

5. Type `autolaunch` at the `sash#` prompt.

A message about Phase II of the installation appears. Proceed to "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

Installing from tape cartridge

You are now ready to begin final installation of A/UX. After you respond to a few prompts, the installation files are copied from tape, which can proceed unattended.

Make sure your Tape Backup 40SC is powered on before continuing with installation. You should also know how to use your Tape Backup 40SC before attempting installation. Refer to *Apple Tape Backup 40SC Owner's Guide* if you have any problems.

1. Read the messages and press RETURN to proceed.

You will see a message like

```
erase is DELETE

Welcome to Part II of the A/UX cartridge tape installation
procedure.  The next step will involve bringing all of A/UX
onto your hard disk from archives stored on the cartridge
tape.

Once you begin, you may not interrupt this procedure.

Press RETURN now to continue [enter q to quit]:
```

You should not interrupt the installation process once you begin. If you do so, you will have to start the installation procedures over beginning with step 1 of "Launching the Installation Process." See "Restarting From Tape After Interruption" at the end of this section if you interrupt the installation process.

Press RETURN to continue.

2. Press RETURN to install optional files.

At this point, you are given the choice of installing the optional files, `/usr/catman` and `/usr/games`. The system displays a message like

```
By default, this procedure installs /usr/catman and
/usr/games.  You may choose to install only a subset of
these files if desired.
```

Install both (catman and games)? [y/n, default=y]:

Important

Entering `y` or pressing RETURN is recommended. At any rate, do not enter `n` without first reading "Leaving Out Optional Files" in Appendix B, "Nonstandard Procedures."

- Press RETURN (or enter `y`) if you want to install both sets of optional files.
- Enter `n` if you do not want to install both sets of optional files. The system then displays the size of the optional files with two messages like

  ```
  /usr/catman requires approximately nnnn Kbytes.
  /usr/games requires approximately nnnn Kbytes.
  ```

  You are then prompted to choose which files to install

  ```
  Install /usr/catman? [y/n]:
  Install /usr/games? [y/n]:
  ```

  Enter `y` or `n` to accept or reject each of the two choices.

3. Insert the tape cartridge.

You will see the prompt

```
Waiting for tape
```

if you have not already inserted the tape cartridge. Insert the tape cartridge now if you have not already done so. After you insert the tape cartridge, the red light on the tape drive will come on for a while. If the `Waiting for tape` prompt continues to appear on your screen, then the installation software is not able to recognize your tape device. Enter `q` to quit now, and see Appendix A, "Troubleshooting" for information on how to recover.

4. Copy the files from tape.

All decisions have been made at this point. The complete copy process will require 75 to 80 minutes.

Copying the installation files from tape begins with a message like

```
Installing basic root files.
Please wait, installation in progress.
```

If you leave the system unattended during the tape copy process, be sure to protect the copy process from interference. If the process is stopped before completion, you must start again beginning with step 1 of "Launching the Installation Process." Copying the root files takes 12 to 14 minutes.

After the root files are copied, continuing progress is signaled by a message like

```
Installing basic /usr files.
Please wait, installation in progress.
```

Copying the `/usr` files takes about 30 minutes. After these files are copied, continuing progress is signaled by a message like

```
Installing optional files.
You have chosen to install: xxxx, ...
Please wait, installation in progress.
```

Copying all optional files requires about 20 minutes. When the copy process is complete, you see a message like

```
Finished with installation.

Activating closeout routine.  This routine performs several
important functions necessary to return control to A/UX.
```

You will now see the final messages:

```
Closing out.  This takes some time.
Making links ... Done
Filling autorecovery partitions ... Done

Doing some cleanup ... Done
Rewinding the tape ... Done

Preparing to reboot from your hard disk ... Done
```

The system now reboots from the SASH Partition, and you should see the A/UX Stand-Alone Shell window as shown in Figure 4-8.

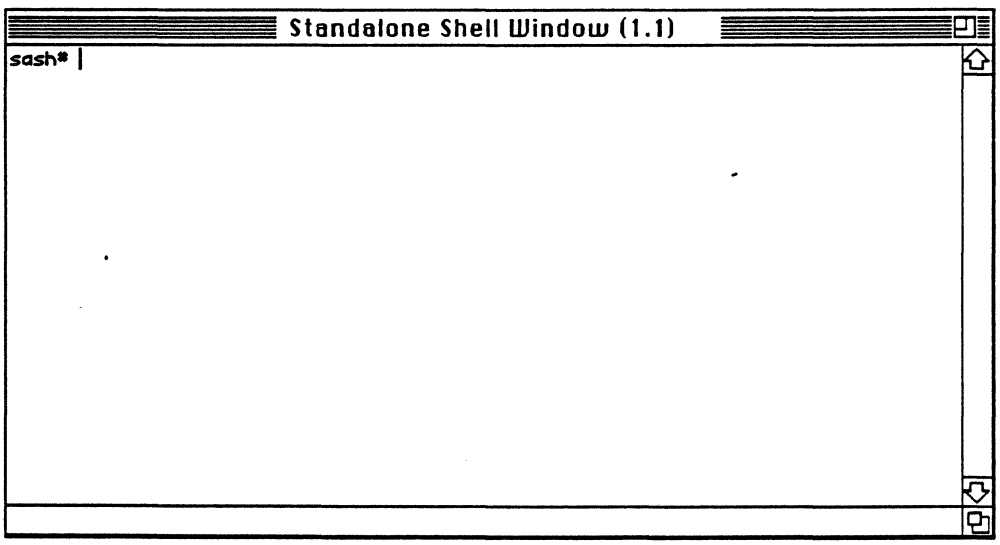

Figure 4-8
The A/UX Stand-Alone Shell (sash) window

5. Remove the tape cartridge.

Remove the tape cartridge and store it in a safe place.

You are almost ready to run A/UX. Go now to Chapter 5, "Getting Ready to Run A/UX 1.1," for information on how to start A/UX.

Restarting from tape after interruption

You should not interrupt the installation process once you begin. If you do so, you will have to start the installation procedures over beginning with step 1 of "Launching the Installation Process."

The only situation in which you may be able to restart the installation after interruption is when your system experiences a power failure. When the power comes back on, the installation routines are restarted. If the installation routines are able to continue you will see the message

```
erase is DELETE

Welcome back to Part II of the A/UX cartridge tape
installation procedure.

Continuing installation with the xxxxxx files

You may not interrupt this procedure except at designated
points. To restart after an interruption, type the command
"/installer".

Press RETURN to continue [enter q to quit]
```

- Enter `q` if you want to exit from the installation procedure.
- Press RETURN to continue with the remaining portion of the installation.

Restoring files

You can also use the A/UX Tape Product or A/UX Floppy Product to restore original installation files that have been lost or damaged. See Appendix C, "Reusing the Installation Media."

Installing from 3.5-inch disks

You are now ready to begin final installation of A/UX. After you respond to a few prompts, the installation files are copied from 3.5-inch disks. The process of repeatedly inserting and removing disks takes between 1 ½ to 2 hours (estimate a little more than 3 minutes per disk).

1. Read the messages and press RETURN to proceed with the installation.

The system displays a message like

```
erase is DELETE

Welcome to Part II of the A/UX floppy installation
procedure.  The next step will involve bringing all of A/UX
onto your hard disk from floppy disks.

If you have two floppy disk drives, be sure to insert all
disks in drive 0 when prompted.


It is not recommended that you interrupt this procedure.
However, if you must do so, you may type q when prompted to
insert the next floppy disk.

Note that if you do quit in this manner, you will have to
start over from the beginning.

Press RETURN now to continue [enter q to quit]:
```

You should not interrupt the installation process once you begin. Should you interrupt the installation process, see "Restarting From 3.5-inch Disks After Interruption" at the end of this section.

2. Press RETURN to install optional files.

At this point you are given the choice of installing certain optional files. The system displays a message like

```
Beginning with disk 1.

By default, this procedure installs /usr/catman and
/usr/games.  You may choose to install only a subset of
these files if desired.

Install both (catman and games)? [y/n, default=y]:
```

Important

Entering `y` or pressing RETURN is recommended. At any rate, do not enter `n` without first reading "Leaving Out Optional Files" in Appendix B, "Nonstandard Procedures."

- ☐ Press RETURN or enter `y` if you want to install both sets of optional files.
- ☐ Enter `n` if you do not want to install both sets of optional files. The system then displays the size of the optional files with two messages like

```
/usr/catman requires approximately nnnn Kbytes.
/usr/games requires approximately nnnn Kbytes.
```

You are then prompted to choose which files to install:

```
Install /usr/catman? [y/n]:
Install /usr/games? [y/n]:
```

Enter `y` or `n` to accept or reject each of the two choices.

3. Insert the disks as prompted.

❖ *Note:* Insert all disks into drive 0 (the drive on the right, if you have more than one drive). During the installation process, the system cannot recognize a disk inserted in any other drive. If you insert a required disk in another drive, you may have to remove the disk manually or quit to eject the disk. If you quit, you must restart from step 1 of "Launching the Installation Process."

Each disk (depending on the total file size) takes a little less than three minutes to install. When figuring the time required for the entire process, estimate somewhat more than three minutes per disk to allow for disk handling, interruptions, and delays.

For each disk in the set of installation disks, starting with disk 1, you will receive messages like

```
Installing basic root files.
Waiting for floppy.  Please Insert A/UX Installation Disk n
                                                [q to quit]
```

The `Waiting for floppy` message blinks until you insert the requested disk. Then the `Waiting for floppy` message is replaced by

```
Processing floppy disk n.
```

When the files on that disk are copied, the disk is ejected from the drive, and you see the `Waiting for floppy` message for the next disk. Remove the ejected disk and insert the required disk. The process continues. Remember that if you quit you must start the installation procedures over beginning with step 1 of "Launching the Installation Process."

When you have finished copying the root file disks, you will copy the `/usr` disk set. You will see the message

```
Installing basic /usr files.
Waiting for floppy.  Please Insert A/UX Installation Disk n
        [q to quit]
```

Continue as before. When these files have been installed, the optional files are copied onto your hard disk. You will see a message like

```
Installing optional files.
  You have chosen to install: xxxx, ...
  Waiting for floppy.Please Insert A/UX Installation Disk n
        [q to quit]
```

The sets you specified are listed (`catman` and `games`). Continue to remove and insert the disks as required.

When all installation disks have been copied successfully, you will see a message like

```
Finished with installation.

Activating closeout routine.  This routine performs several
important functions necessary to return control to A/UX.
```

You will now see the final messages

```
Closing out.  This takes some time.
Making links ... Done
Filling autorecovery partitions ... Done

Doing some cleanup ... Done

Preparing to reboot from your hard disk ... Done
```

The system now reboots from the SASH Partition and you should see the A/UX Stand-Alone Shell window as shown in Figure 4-9.

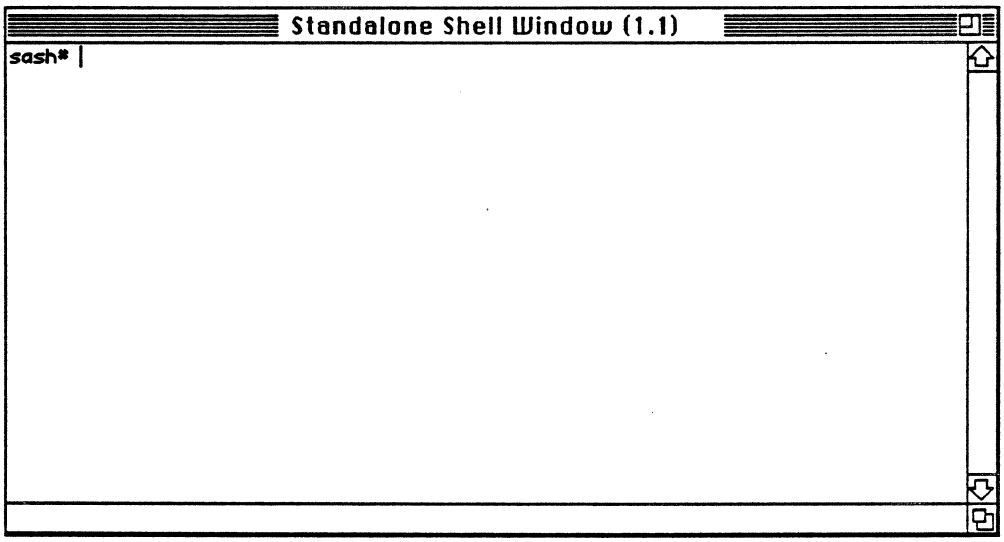

Figure 4-9
The A/UX Stand-Alone Shell (sash) window

You are almost ready to run A/UX. Go to Chapter 5, "Getting Ready to Run A/UX 1.1," for information on how to start A/UX.

Restarting from disks after interruption

You should not interrupt the installation process once you begin. If you do so, you will have to start the installation procedures over beginning with step 1 of "Launching the Installation Process."

The only situation in which you may be able to restart the installation after interruption is when your system experiences a power failure. When the power comes back on, the installation routines are restarted. If the installation routines are able to continue you will see the messages

```
erase is DELETE

Welcome back to Part II of the A/UX floppy disk
installation procedure.

It is not recommended that you interrupt this procedure
except at designated points. However, if you must do so,
you may type q when prompted to insert the next floppy
disk.

Note that if you do quit in this manner, you will have to
start over from the beginning.

Press RETURN now to continue [enter q to quit]:
```

- Enter `q` if you want to exit from the installation procedure.
- Press RETURN to continue with the remaining portion of the installation.

Restoring files

You can also use the A/UX Tape Product or A/UX Floppy Product to restore original installation files that have been lost or damaged. See Appendix C, "Reusing the Installation Media."

Chapter 5

Getting Ready to Run A/UX 1.1

This chapter presents the information necessary to get your A/UX system ready to run. In order to run A/UX you must first prepare the Macintosh to start up and then set it to boot A/UX. You establish this procedure by setting parameters. Before you start up A/UX 1.1 for the first time, you *must* do the following:

- Set the Macintosh startup device.
- Set the Macintosh time and date.
- Set the GMT bias for A/UX.
- Set the boot disk for A/UX.
- Set the `launch` application to start up automatically from `sash`.
- Set the startup application in the Macintosh OS.

When you complete these procedures and restart the computer, A/UX will start up automatically. You can change the startup sequence later by using *Local System Administration*. For now, complete all the sections in this chapter, unless you are directed not to do so.

Setting the startup device

When you switch on the Macintosh, it follows a specified order when it scans for a System file.

1. Internal 3.5-inch disk drive(s). If you have two disk drives, it looks first at the drive on the right.
2. Internal hard disk.
3. External SCSI hard disk with the highest ID number.
4. External hard disk with the next highest ID number.

You use the Control Panel desk accessory to override the scanning sequence during startup. You should designate the hard disk with A/UX on it as your startup disk. You can change this order later if you like.

1. Choose Control Panel from the Apple menu.

- Place the cursor on the Apple menu and press the mouse button to open it.
- Drag the pointer down until Control Panel is highlighted.
- Release the mouse button.

The Control Panel dialog box appears, as shown in Figure 5-1.

If you set the startup device and application as part of the update procedure in Chapter 3, "Organizing Your Hard Disk," skip to step 5.

2. Click the Startup Device icon.

If necessary, use the scroll bar to bring the Startup Device icon into view.

3. Click the icon that represents the hard disk named SASH Partition.

The icon is highlighted. When you start up your computer, the system uses that hard disk as the startup disk, (unless you first insert a 3.5-inch disk that contains a System Folder).

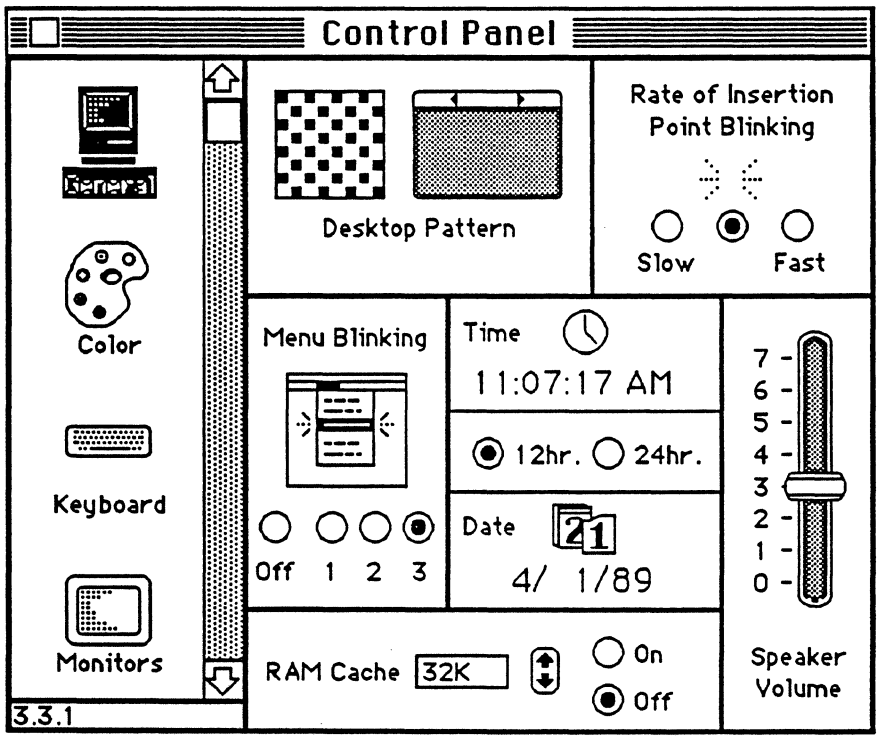

Figure 5-1
The Control Panel dialog box

4. Click General.

If necessary, use the scroll bar to bring the General icon into view.

5. Click the hour digit in the time area.

The digit is highlighted and arrows appear, as shown in Figure 5-2.

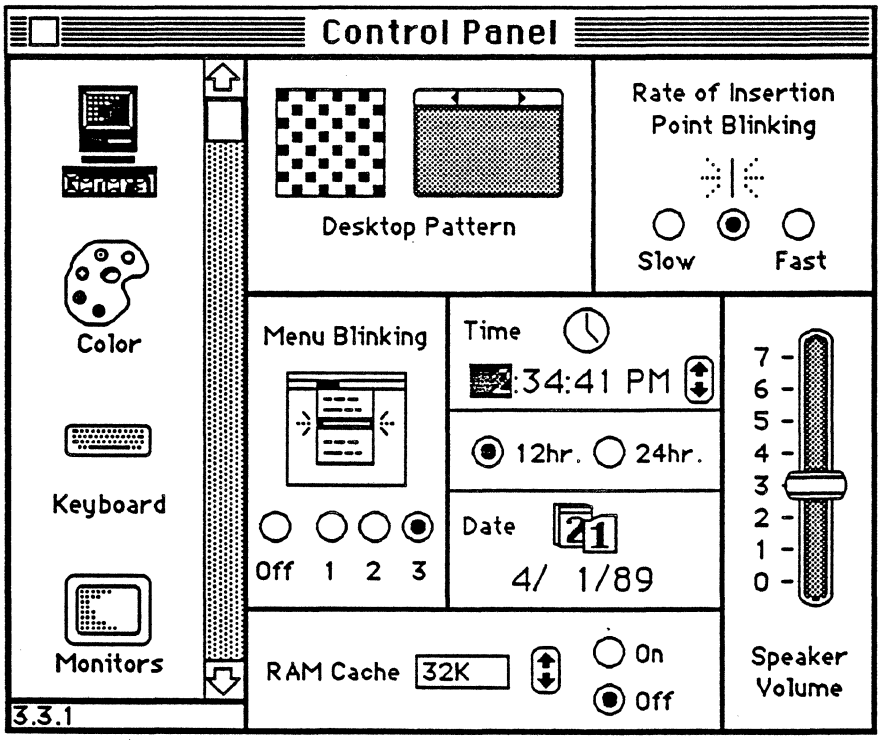

Figure 5-2
The Time area

6. Click the up arrow or down arrow to adjust the hour to the time in your area.

7. Repeat the steps above to adjust the minutes and seconds.

8. Click 12hr. or 24hr.

This setting determines the display mode of the time in the Macintosh OS.

9. Click the month digit in the Date area.

The digit is highlighted and arrows appear, as shown in Figure 5-3.

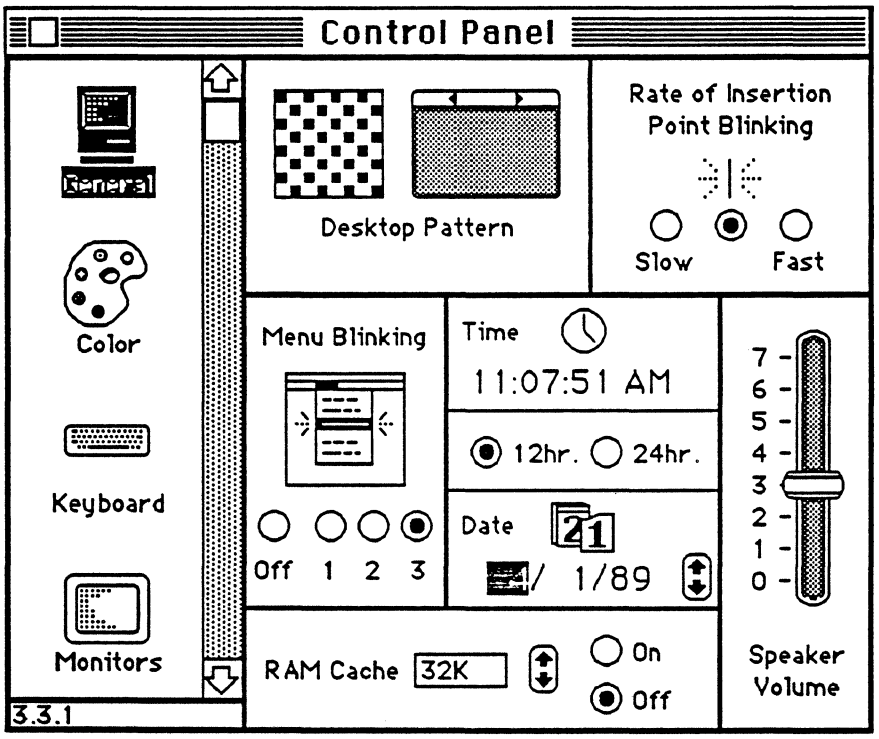

Figure 5-3
The Date area

10. Click the up arrow or down arrow to adjust the month to the current date.

11. Repeat the steps just given for changing the day and year.

12. Close the Control Panel.

Click the Close box (on the left edge of the Control Panel title bar) or choose Close from the File menu.

Setting sash parameters

The hard disk containing A/UX contains a small Macintosh partition named SASH Partition. This part of the hard disk contains the A/UX Stand-Alone Shell (sash), a Macintosh System Folder with startup files for the Macintosh Operating System (OS), and several A/UX stand-alone utilities. The most common task of sash is to start A/UX, so that A/UX takes control over the functions of the computer. Before you can start up A/UX you need to set some parameters from the Stand-Alone Shell and from the Macintosh Finder. The sections that follow provide instructions for setting these parameters.

Launching sash

If you are currently in the Macintosh Finder, you need to launch sash to set the necessary parameters. With the SASH Partition window open, follow these steps:

1. **Click sash.**

   The icon is highlighted.

2. **Choose Open from the File menu.**

   As a shortcut you can double-click the icon to open sash.

   The sash application launches and the sash window appears on the screen, as shown in Figure 5-4.

Setting time conversion and the boot disk

You need to set several variables before you start up A/UX the first time. You identify the hard disk that contains the startup files and set a time conversion for A/UX by using the General dialog box.

Follow these steps to set the time conversion and the boot disk:

1. **Choose General from the Preferences menu.**

   The General command appears highlighted, as shown in Figure 5-5.

   When you release the mouse button, the General dialog box appears, as shown in Figure 5-6.

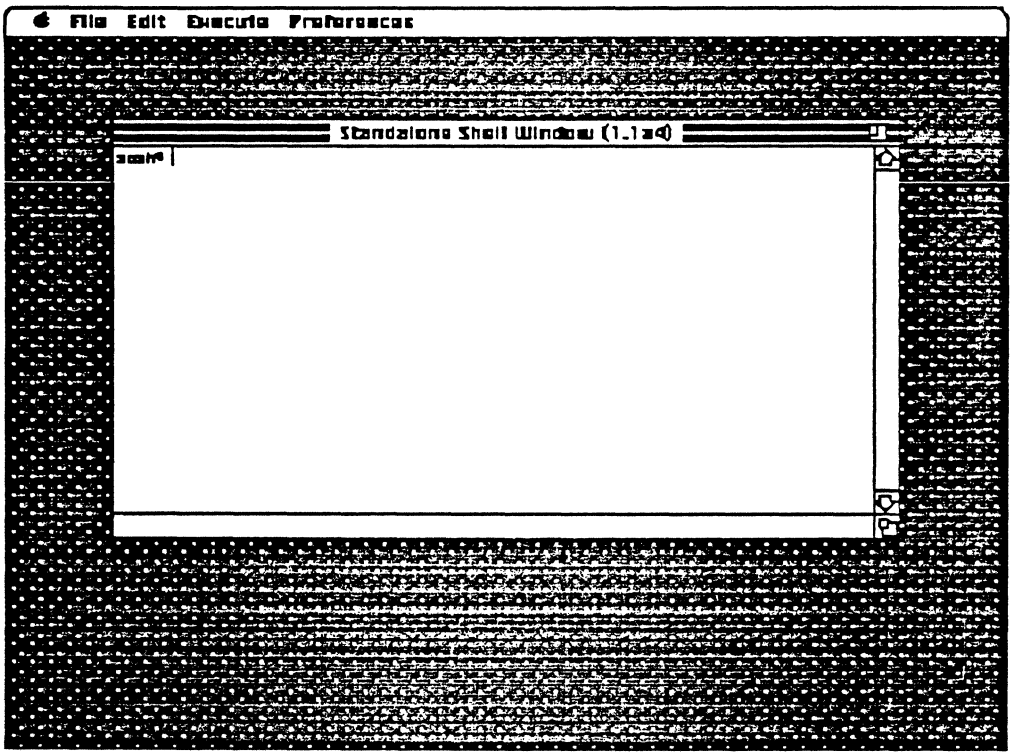

Figure 5-4
The A/UX Stand-Alone Shell (`sash`) window

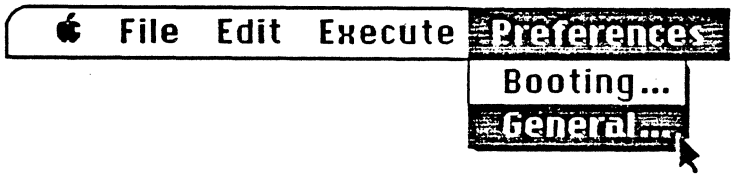

Figure 5-5
Choosing General

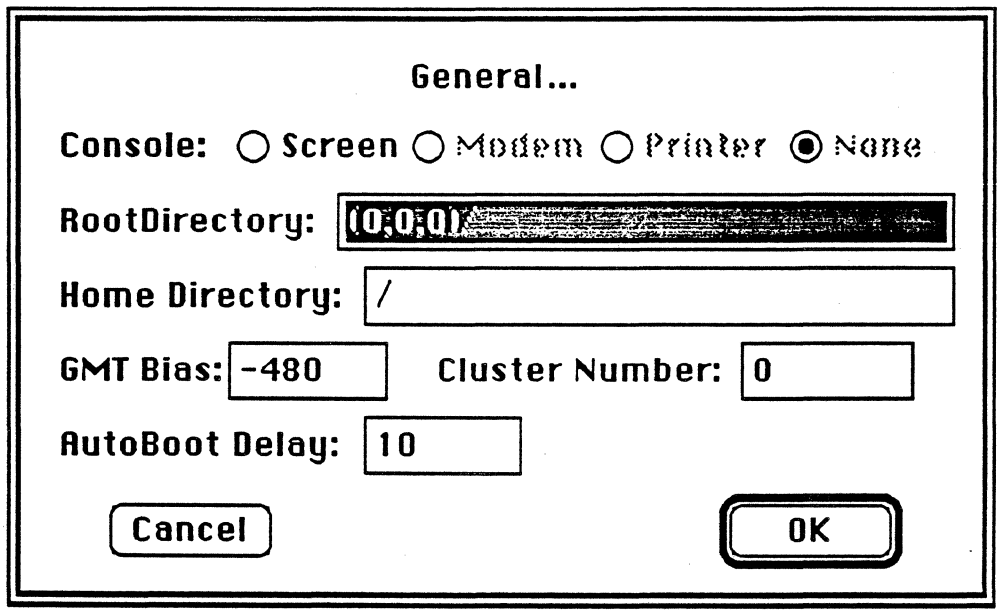

Figure 5-6
The General dialog box

2. Check the SCSI ID parameter in the RootDirectory box.

You use the RootDirectory box to identify the disk from which `sash` starts A/UX. This box contains three parameters. The first parameter identifies the SCSI ID number of the disk that contains startup files for the Macintosh OS. This parameter is set to 0 for an internal hard disk or 5 for an external hard disk. (See Figure 5-7.)

For more information on the RootDirectory parameters, see *A/UX Local System Administration.*

- If you need to change the SCSI ID number, select the first 0 in the RootDirectory box by dragging. Type the SCSI ID number of the hard disk that contains startup files.

3. Check the GMT Bias and replace the value if necessary.

Examine the GMT Bias to see whether it needs modification. A/UX comes set to –480 for Pacific Standard Time. If you live in a different time zone or the current time is Daylight Saving Time, you need to change this setting.

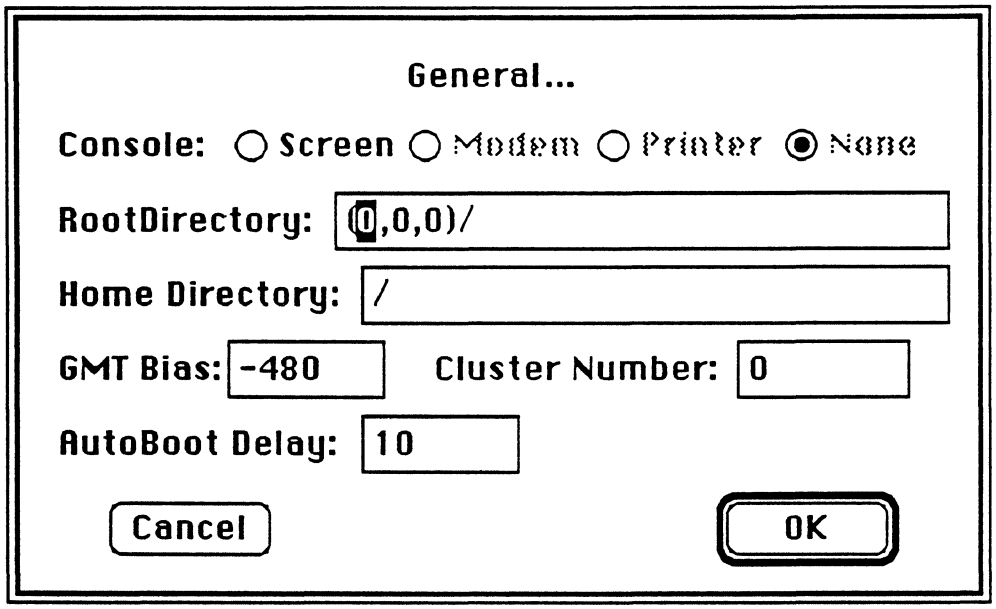

Figure 5-7
Changing the SCSI ID number

The Macintosh OS and A/UX clocks use the GMT Bias setting to synchronize with each other. Refer to the map at the end of this chapter for the correct GMT bias for your location. The map shows Standard Time.

- To change the GMT Bias, select the value by dragging across it. Type the value for your time zone. For example, the East Coast of the United States has a bias of –300 during standard time (–240 during Daylight Saving Time).

4. Click OK.

This action accepts the values and closes the General dialog box.

Setting A/UX to boot automatically

Follow these steps to set A/UX to boot automatically:

1. Choose Booting from the Preferences menu.

The Booting dialog box appears, as shown in Figure 5-8.

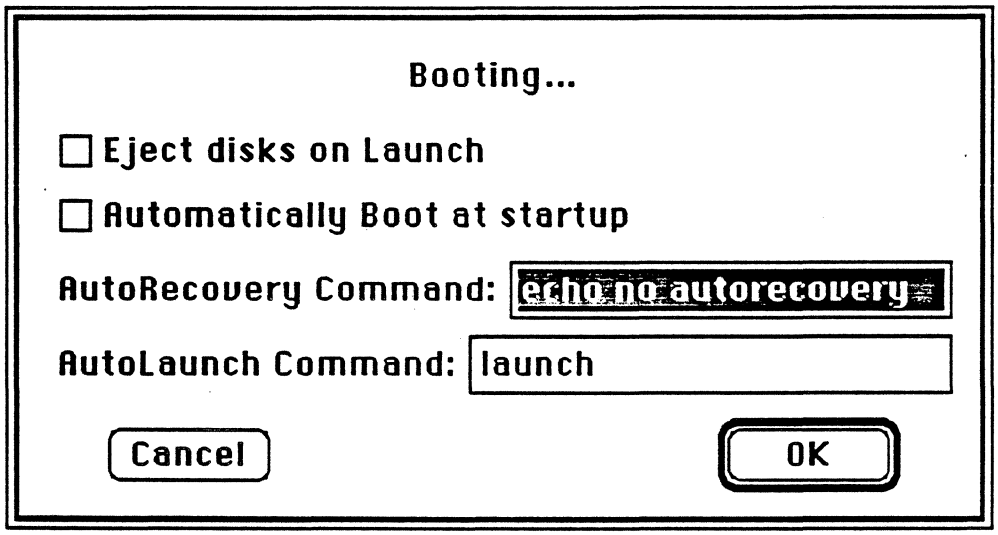

Figure 5-8
The Booting dialog box

2. Click Automatically Boot at startup.

An X appears in the check box.

3. Click OK.

This action accepts the new value and closes the Booting dialog box.

4. Choose Quit from the File menu.

You return to the Macintosh Finder, as shown in Figure 5-9.

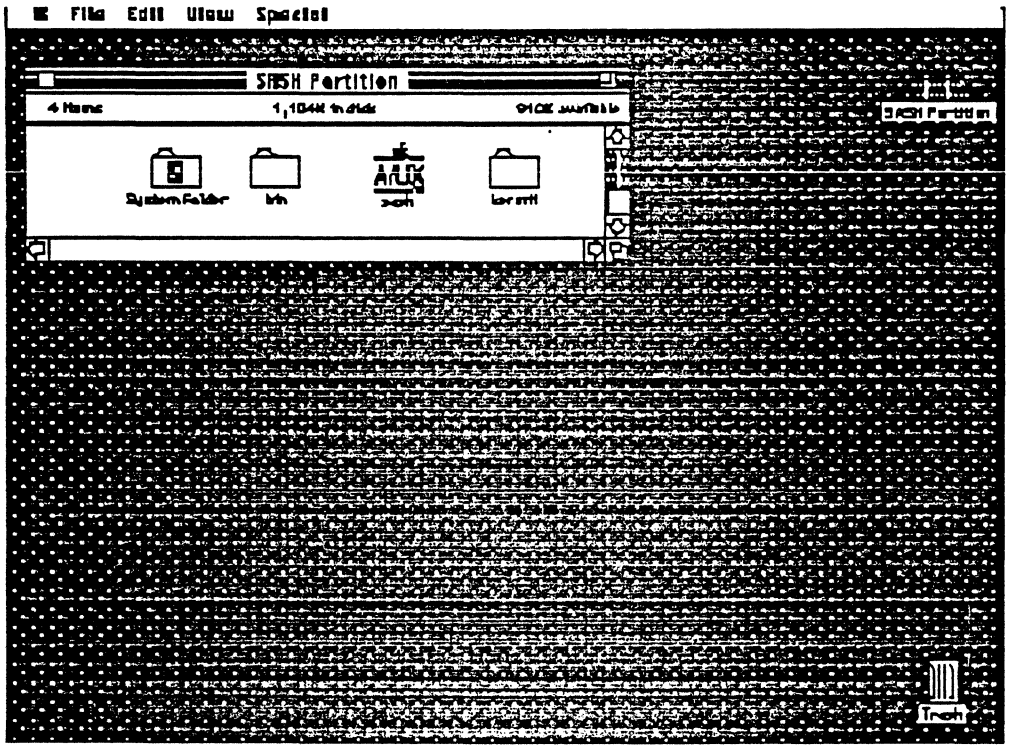

Figure 5-9
The Macintosh Finder

Setting `sash` as the startup application

Follow these steps to set `sash` as the startup application. If you set the startup application as part of the procedures in Chapter 3, "Organizing Your Hard Disk," skip to step 4.

1. Click the `sash` icon to select it.

The icon appears highlighted, as shown in Figure 5-10.

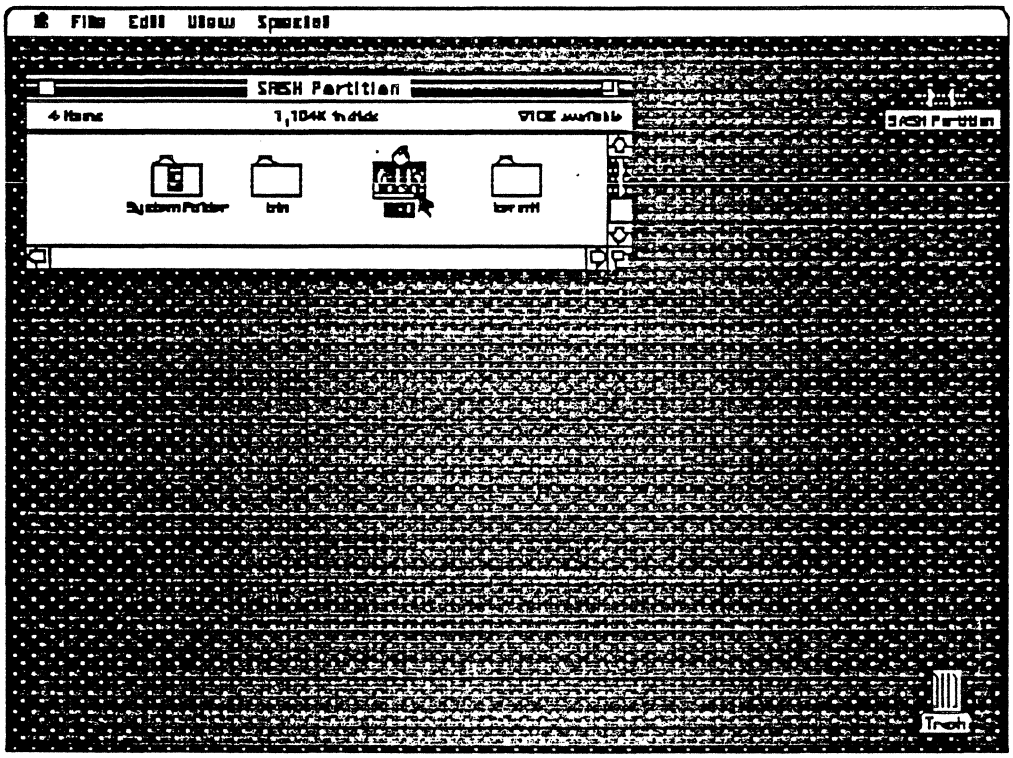

Figure 5-10
The `sash` icon selected

2. Choose Set Startup from the Special menu.

The Set Startup dialog box appears, as shown in Figure 5-11. The radio button next to `sash` is selected to designate it as the startup application.

3. Click OK.

This action sets `sash` to start up immediately when you turn on the Macintosh using the POWER ON key. It also closes the dialog box.

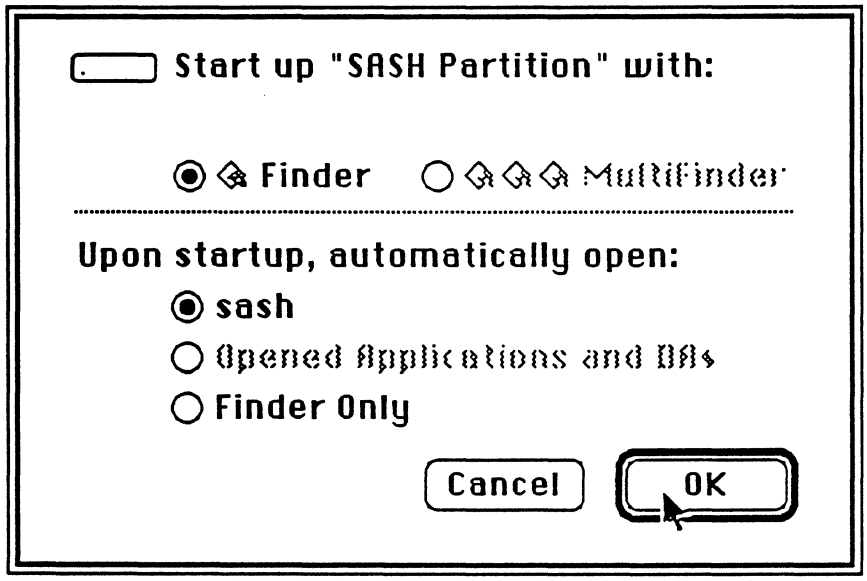

Figure 5-11
The Set Startup dialog box

4. Choose Restart from the Special menu.

Now your A/UX 1.1 system is set up and ready to run. You will see the automatic startup screen, which will count down from 10 to 0 and then automatically launch A/UX. You will continue to see some messages describing the launching process. This process takes about 90 seconds.

You will need to set some more details in A/UX before you can use any of the programs or utilities in A/UX 1.1. Go on to Chapter 6, "Running A/UX 1.1 for the First Time," to continue the installation process.

Chapter 6

Running A/UX 1.1 for the First Time

This chapter describes how to set various details that are particular to your site. These details include supplying your computer's host and domain names, and setting the local time in A/UX. For U.S. and Canadian installations, you can also enable data encryption, if you require this for system security.

When following the instructions in this chapter, don't worry about making mistakes. If necessary you can change any of these system-specific details later.

- *Use of the mouse:* Your mouse does not work in the Initial Console Emulator window that appears on your screen; however, you may be able to use the mouse with other A/UX applications.

Starting your system for the first time

At the end of Chapter 5, "Getting Ready to Run A/UX 1.1," you should have restarted your system. If you did not do so, restart your system now by choosing Restart from the Special menu. You should see the automatic startup screen, which will count down from 10 to 0 and then automatically launch A/UX.

You should now see A/UX copyright and Release ID information on your screen, along with today's date and time. (Don't worry if the time is incorrect; you will be setting the correct time later.) You will then see the prompt

```
Do you want to check the root file system? (y or n)
[default: n]
```

- Answer yes by entering

```
y
```

This invokes the `fsck` (file system checking) program. The `fsck` program checks the root file system for inconsistencies. This takes a couple of minutes. You should usually run the `fsck` program when you start up A/UX. You will notice that the `fsck` program checks the file system in several phases and, at the end of each phase, `fsck` displays a message on your screen.

If `fsck` finds any problems in the file system, it either fixes them automatically or prompts for your input. If this is the first time you have started A/UX, `fsck` should not report any problems. See *A/UX Local System Administration* if you need more information on the `fsck` program.

After `fsck` successfully checks the root file system, go to the next section to set system-specific details.

Setting system-specific details

You can now customize your system by giving your system a unique host name and domain name. You can also set the time and date to your local time. The next sections show you how to set these system-specific details.

If you have updated to A/UX 1.1, your host name and domain name have been preserved and you will not be prompted to set them. If you have updated your system skip to the section "Entering Single-User Mode."

Setting your host name

A host name is used to identify your computer on a network. You need to set a host name if you plan to share resources, such as files or programs, with other computers or if you plan to send mail to other computers in a network. Even if your computer won't be in a network at present, you must specify a host name at this time. You should now see the prompt

```
Please enter a hostname (it must be unique):
```

You can change the host name of your computer later by editing the first field of the file `/etc/HOSTNAME`, so assigning your computer a temporary host name will not cause a problem. If you can't think of a host name, you can simply call it `noname` for now. If your computer will be on a network, it is ultimately the responsibility of your network administrator to ensure that your computer's host name is suitable.

The host name must be unique among all other computer host names in your network domain. (The next section explains domains.) It is common for administrators to give related names to hosts to help identify them by work group. One department, for instance, may name all its computers after cartoon characters; another department may name them after mythological heroes; and still another may name them after sports cars.

In any case, the host name you enter now should consist only of lowercase letters, digits, and dashes. It should begin with a letter and can end with a letter or a digit, but not with a dash. For network compatibility, make your host name no longer than eight characters.

- ☐ Enter a host name now. For example, if you're going to use the host name `noname` for now, enter

  ```
  noname
  ```

Go on to the next section to set the domain name.

Setting your domain name

A domain name refers collectively to a group of locally connected computers. If your computer will be joining an Ethernet local area network that supports the Network File System Yellow Pages facility, the domain name you enter here identifies your computer to the nearby connected hosts that share the same Yellow Pages database of network users and computers. Even if your computer won't be in a network at present, you must specify a domain name at this time.

The next prompt you receive is

```
Please enter a domain name:
```

Unlike host names, which must be unique for each computer, a domain name is shared by a group of computers. For example, all the computers in a company's design department might be given the domain name `design1`.

The Yellow Pages facility simplifies network and local system administration by allowing multiple computers to share a common database of users. This shared database ensures that users have the same user IDs (UIDs) and group IDs (GIDs) on computers throughout the network; this greatly simplifies setting and removing access permissions for individuals working on group projects across a network. If your computer is on a network that uses Yellow Pages, it is up to your network administrator to assign your computer's domain name.

In any case, you must enter a domain name now. The name should consist only of lowercase letters, digits, and dashes; it should begin with a letter and may end with a letter or a digit — but not with a dash. For network compatibility, limit the entire name to eight characters. You can easily change the domain name in the future by editing the second field of the file `/etc/HOSTNAME`, so assigning your computer a temporary domain name will not cause a problem. If you can't think of a domain name, you might just use `unnamed` for now.

- ☐ Enter a domain name now. For example, if you're going to call your domain `unnamed` for now, enter

  ```
  unnamed
  ```

After a few moments your system enters single-user mode. Proceed to the next section for more information.

Entering single-user mode

You should now see the message

```
INIT: SINGLE USER MODE
```

This message tells you that A/UX is running in single-user mode. By default, when the system restarts it comes up in single-user mode. In single-user mode, many processes — particularly those that allow multiple users to access the system — will not be started yet.

In single-user mode, you have all the privileges of the root user. You can create or destroy anything on the system — files, directories, or processes — in just a few keystrokes. This level of power is necessary but you need to use it selectively. Usually you should run A/UX in multi-user mode. The section, "Changing to Multi-User Mode," shows you how to run A/UX in multi-user mode.

Next you will be prompted to set your terminal type. The next section describes how to do this.

Accepting the terminal type

After you see the message telling you that the system is in single-user mode, you will see the prompt

```
TERM = (mac2)
```

□ Press RETURN to accept `mac2` as the terminal type.

The name `mac2` designates the standard terminal type for the Macintosh II and Macintosh IIx console monitors. A/UX uses this standard type even though A/UX can read data from and write data to hundreds of different terminal types. By pressing RETURN in response to the prompt, you instruct A/UX to treat the console as a `mac2` terminal type, which provides a partial emulation of the DEC VT100 (a popular industry terminal) while taking advantage of the large display of the Macintosh II and Macintosh IIx screens.

In the future you can enter the name of another terminal type if necessary. This will prove helpful if you connect another type of terminal to your Macintosh II or Macintosh IIx, or if you use a terminal from across a network to log in to your system. However, never use another terminal type to log in to the Macintosh II or Macintosh IIx console monitor.

After pressing RETURN, you will see the date and time followed by the command prompt for the `root` account.

```
hostname.root #
```

The *hostname* that appears in your prompt will be the name you assigned in the previous section, "Setting Your Host Name." The name `root` applies to the user with unlimited access to all A/UX files.

The command prompt (*hostname*.`root#`) indicates that A/UX is ready for a command. You give commands by typing a command name and pressing RETURN. The next section shows you how to use a few simple commands.

Go on to the next section to set the system time.

Setting the system time

To set the correct system time, you need to provide information about your time zone to A/UX. With this time zone information, A/UX can maintain time and date consistency with any other UNIX system in the world that has been set to its correct local time and date. This section assumes you have already done the following

- Set the system time from the Control Panel in the Macintosh OS. You did this in Chapter 5.
- Set the GMT Bias from the Preferences menu in `sash`. You did this in Chapter 5.

A/UX is critically dependent on having accurate time, since many activities are monitored or controlled from current system time. To perform these tasks, you must maintain accurate time for both the A/UX and Macintosh operating systems. This is because A/UX and the Macintosh OS share a single hardware clock but deal with time quite differently. To the Macintosh OS, the date and time are those specified by the user. No effort is made to handle time zones, daylight savings, or other issues.

In contrast A/UX keeps the date and time in terms of Greenwich Mean Time (GMT). The system's software handles variations from GMT, and this lets you customize your time information, if necessary. To let A/UX know what time zone your system is in, you must set the A/UX time zone by linking the correct file in `/etc/zoneinfo` to the `localtime` file and by modifying the `/etc/TIMEZONE` file.

Important

Whereas A/UX is capable of handling changes to and from Daylight Saving Time, the Macintosh OS is not. Consequently you should reset the GMT bias in `sash` when you change to or from Daylight Saving Time; otherwise, the wrong time will be displayed in the Macintosh OS. Refer to the instructions in "Setting Time Conversion and the Boot Disk" in Chapter 5 to perform this adjustment.

Follow these steps to set the time in A/UX:

1. Enter `date` to check the system time.

Check the current time and date by entering

```
date
```

from the command prompt `hostname.root#`. If the correct date and time is displayed, you can go on to the next section. If the correct date and time for your time zone is not displayed, complete the following steps.

2. Change to the `/etc/zoneinfo` directory.

Change to the `/etc/zoneinfo` directory by entering

```
cd /etc/zoneinfo
```

Be sure to put a space between `cd` and `/etc/zoneinfo`. The `/etc/zoneinfo` directory contains a list of time zone files.

3. Enter `ls -CF`

Examine the available time zone choices by entering

```
ls -CF
```

This command displays a formatted list of time zone files and directories. (Directories have slashes appended to them. For example `Australia/` is a directory. These time zones are broad enough to have other time zones within them.)

Some time zone files automatically allow A/UX to make the proper adjustments for Daylight Saving Time. For example, if you specify either of the time zone files `EST5EDT` or `PST8DST`, you do not have to make any further adjustments to A/UX for Daylight Saving Time later. If you use the time zone files `GMT-5` or `GMT-8`, you will have to adjust A/UX for Daylight Saving Time later.

- If your time zone is shown as a file, you will link that filename to the `localtime` file. For example, `Japan`, `PST8PDT`, `EST5EDT`, and `GMT-3` are time zones represented by a file.
- If your time zone is shown as a directory, you must display the contents of the directory by entering the `ls` command with the time zone name. For example, if you are setting the time zone for a system in Australia, enter

```
ls -CF Australia
```

Determine the appropriate time zone file within that directory and make a note of it. For example, if the correct time zone is `Tasmania`, the relative pathname for the time zone file would be `Australia/Tasmania`. You will later link that filename to the `localtime` file.

4. Enter `set`

To examine your current time zone enter

```
set
```

You should see a number of lines displayed. Find the line showing the characters TZ. You should see a line similar to

```
TZ=PST8PDT
```

The value on the right side of the equation is your current default time zone. Go to the next step to set the correct time zone for your system.

5. Set the new time zone.

- Enter

  ```
  rm localtime
  ```

  Don't worry about removing this file; you are going to create a new `localtime` file.

- Link your time zone filename to the `localtime` file by entering

  `ln` *timezone_file* `localtime`

  where *timezone_file* is the filename for your time zone.

  For example, if your time zone file is `Japan` enter

  ```
  ln Japan localtime
  ```

  If your time zone file is `Australia/Tasmania` enter

  ```
  ln Australia/Tasmania localtime
  ```

- Use a text editor to edit the `/etc/TIMEZONE` file, changing the current contents to the name of the time zone you just entered (such as `Japan`, `PST8PDT`, or `Australia/Tasmania`). Save the file and close it. Your default A/UX time zone is now set.

❖ *Note:* If you do not know how to use a text editor, you can change the contents of the `/etc/TIMEZONE` file by entering

```
echo 'timezone_file' > /etc/TIMEZONE
```

where *timezone_file* is replaced by the name of the time zone you entered in the previous `ln` command. Note that the single quotes surrounding the name of the time zone file are required. You can verify the contents of the `/etc/TIMEZONE` file using the command `cat /etc/TIMEZONE`.

6. Enter `exit` to have the new system time take effect.

You must enter

```
exit
```

for the changes you have just made to take effect. The `exit` command is usually given from multi-user mode when you want to log out or quit your current session. Because you cannot really exit from single-user mode without shutting your system down, when you use the `exit` command from single-user mode, the system reenters single-user mode. Once the system reenters single-user mode you will see the message

```
INIT: SINGLE USER MODE
```

You are again asked to accept `mac2` as your terminal type when you see this prompt

```
TERM= (mac2)
```

Press RETURN. You should now see the prompt for the root user again.

hostname`.root#`

7. Enter `date` to check the new system time.

- Check the current time and date by entering

  ```
  date
  ```

  This command should display the proper date and time. If it does not, check to make sure that you chose the correct time zone and gave the Macintosh OS the correct time and GMT bias.

You can reset the time from A/UX, if you wish, by using the `date` command. You can also reset the GMT bias from A/UX by using the `mactime` command. See `date`(1) and `mactime`(1) in *A/UX Command Reference* for more information. If you set the time and date from within A/UX, it is important that you first set the correct time zone.

Enabling data encryption

Data encryption is an optional feature for United States and Canadian installations. If you don't want to enable data encryption at this point, you can go to the section, "Setting the `root` Password."

What you need now

If your installation is in the U.S. or Canada and you want to enable data encryption, have the following 3.5-inch disk ready:

- *A/UX Data Encryption Standard (DES).*

Installing data encryption

The Data Encryption Standard (DES) program allows you to run versions of the A/UX utilities (`ed`, `vi`, `ex`, and `crypt`) that support the National Security Administration (NSA) Data Encryption Standard (DES) algorithm. You can install this optional program if you want to encrypt files. Follow these steps to enable data encryption:

- Enter

```
cd /
finstall
```

You should see messages on your screen similar to this:

```
finstall:     This is the finstall program.  It installs
finstall:     software from a floppy disk onto your
finstall:     system.  It will give you a chance to see
finstall:     what software is being installed and how
finstall:     much disk space it will need before anything
finstall:     is actually installed.

finstall:     You may stop the finstall procedure at
finstall:     anytime by pressing CTL-C ...

finstall: Press RETURN when you are ready to proceed:
```

- Do as the screen messages instruct to complete your installation or update procedure. When responding to prompts, accept the default answers by pressing RETURN. When you are prompted to insert floppy number 1, insert the disk labeled *A/UX Data Encryption Standard (DES)*. The copying process will take 4 or 5 minutes. Refer to `crypt(3)` in *A/UX Command Reference* for details about data encryption.

Proceed now to the next section for instructions on setting the `root` password and bringing the system up in multi-user mode.

Setting the `root` password

This section explains how to set your `root` password for three special accounts that confer unlimited privileges. The user with these privileges is called the root user and has access to all files, commands, and processes in your system. These special accounts are

- `root`
- `rootcsh`
- `rootksh`

The user of the `root` account uses the standard System V Bourne shell; the user of the `rootksh` account uses the newer AT&T Korn shell; and the user of the `rootcsh` account uses the BSD C shell. You should have a password for all three of these accounts, even if you intend to log into only one of them. If you fail to supply a password for any one of these accounts, you create a hole in your system security, because someone could log into that account and gain system-wide access to all files and processes. To avoid confusion, you should probably use the same password on all three accounts.

Since the user of the `root`, `rootcsh`, and `rootksh` accounts has unlimited privileges to all files in the system, it is important that you set the password right away to prevent inexperienced or malicious users from accessing the system as the root user.

You will set your root password while still in single-user mode. After you set your password, you will then bring your system up in multi-user mode, which is more secure because it requires users to identify themselves before using the system.

Choosing a password

Your first step is to decide on a password to use. Choose a password that you can remember easily, but don't make it so easy that others might guess it. For example, don't use your name, initials, or telephone number. One way to derive a fairly secure password is to combine into a single word two or more short words that are meaningful to you and then spell it with a mixture of uppercase and lowercase letters and nonalphabetic characters. For example, `!noSmoking`, `$2toWin`, and `MacII4me` would make acceptable passwords (but since they're printed here, don't use them as passwords on your system).

Passwords for all users other than the root user must meet certain requirements. Although the root user doesn't have to adhere to them, you might follow them now anyway because they help create a more secure password, and they make you aware of the rules that non-root users must follow. These requirements are as follows:

- A password must consist of at least six characters. Only the first eight are used for verification, but you can include additional characters if they make the password more meaningful.
- A password must contain at least two alphabetic characters. Remember that A/UX and other UNIX operating systems are case sensitive; for example, *s* and *S* are treated as two different characters.
- A password must contain at least one numeric (0 through 9) or one special character (such as a punctuation mark).
- A password must differ from the login name and from any reverse or circular shift of the login name. Also, in determining the uniqueness of the password from the login name, uppercase letters and their corresponding lowercase letters *are* counted as equivalent. For example, some of the prohibited passwords for the login name `cynthia` are: `aihtnyc`, `ynthiac`, and `cynThia`.

Since your system is now running in single-user mode (also called run-level S), A/UX accepts input only from the system console (normally, the Macintosh II or Macintosh IIx keyboard) and writes output only to the system console (normally, the Macintosh II or Macintosh IIx screen).

The prompt

hostname`.root #`

should appear on your screen.

Whoever has access to the system console at this time has root user privilege to every file and command in the system. Single-user mode is therefore a dangerous state in which to leave your computer unattended.

Setting a password for the `root` account

Follow these steps to set the root password for the root user that uses the Bourne shell:

1. Enter `passwd root` to set the password for the user `root`.

Enter

```
passwd root
```

You will see the prompt

```
New password:
```

2. Enter your password.

Enter the password you've decided on. For security the characters you type are not printed on your screen.

3. **Reenter the password you just set.**

   For verification, A/UX prompts you to reenter your password.

   ```
   Re-enter new password:
   ```

   Enter your password again. Unless you mistyped the password, you will again see the `root` command prompt

   ```
   hostname.root #
   ```

   If you don't enter exactly the same characters at both password prompts, you will see the message

   ```
   They don't match; try again.
   New password:
   ```

   You'll have to restart the procedure by entering your password again. When you're prompted

   ```
   Re-enter new password:
   ```

   type the characters carefully to ensure that they match those you just entered.

Setting a password for the `rootksh` account

Follow these steps to set the password for the root user that uses the Korn shell:

1. **Enter `passwd rootksh` to set the password for the user `rootksh`.**

   Enter

   ```
   passwd rootksh
   ```

   One of the root user's privileges is the ability to change any other user's password at any time by invoking that user's login name as an argument to the `passwd` command.

   You will see the prompt

   ```
   New password:
   ```

2. **Enter the same password you used for the `root` account.**

   You will again be prompted to reenter the password.

   ```
   Re-enter new password:
   ```

3. **Enter the password once more.**

   Unless you mistyped the password, you'll again see the `root` command prompt

   hostname`.root #`

Setting a password for the `rootcsh` account

Follow these steps to set the password for the root user that uses the C shell:

1. **Enter `passwd rootcsh` to set the password for the user `rootcsh`.**

   Enter

   ```
   passwd rootcsh
   ```

   You will see the prompt

   ```
   New password:
   ```

2. **Enter the same password you used for the `root` account.**

   You will again be prompted to reenter the password.

   ```
   Re-enter new password:
   ```

3. **Enter the password once more.**

   Unless you mistyped the password, you'll again see the `root` command prompt

   hostname`.root #`

Changing to multi-user mode

The multi-user mode is the normal operating mode of your system. It affords more security for your system, allows other users to log in to their own accounts, and allows you to use various peripherals such as printers and modems. This section explains how to change from single-user mode to multi-user mode in A/UX. It also lets you check the `root` password you just set.

Follow these steps to bring your system up in multi-user mode from single-user mode:

1. Enter `init 2`

Enter

```
init 2
```

to bring your system to run-level 2. (Be sure to include a space between `init` and 2. If you mistype, press DELETE to back over and erase previous characters, and then continue typing.) The `init 2` command starts additional processes so that multiple users can use the system simultaneously.

When A/UX enters multi-user mode, you see this message on the console:

```
INIT: New run level: 2
```

2. Enter `n` to refrain from checking file systems.

You will see the prompt

```
Do you want to check the file systems? (y or n) [default: n]
```

At this point there are no file systems other than `root` to check (unless you put `/usr` on a separate file system). If you put `/usr` on a separate file system, see *A/UX Local System Administration* for information on adding the `/usr` file system to the list of file systems in `/etc/fstab`.

Enter `n` for now (or just press RETURN to accept `n`, the default answer) since you checked the `root` file system when you first entered single-user mode.

Ignore the message

```
mv: cannot access /usr/lib/cron/log
```

if it appears.

You will see the login prompt

```
Apple Computer, Inc. A/UX

login:
```

A/UX is now fully operational in multi-user mode.

3. Log in as the root user.

At the prompt, enter

```
root
```

to log in under the `root` account. Because the password of the `root` account has been set, you'll be prompted for a password:

```
Password:
```

Enter the password you just set. For security reasons, your password is not displayed on the screen.

4. Press RETURN to accept `mac2` as the terminal type.

A login banner appears on your terminal screen. This banner is called the message of the day, and it can be changed to anything you want to display. *A/UX Local System Administration* explains how to change this message.

Following the message of the day you will see the line

```
TERM = (mac2)
```

Press RETURN, and you will again see the command prompt for the `root` account.

hostname`.root #`

If you have updated your system to A/UX 1.1, go to the next section, "Restoring Saved Files" to restore system administration settings. Otherwise go to the section, "Shutting Down and Restarting," which describes how to shut down your computer and bring your system back to single-user mode.

Restoring saved files

If you updated your system from a previous release of A/UX to A/UX 1.1, you can make your system administration tasks for the new release easier by using the information in your old system files to customize your new system files.

In most cases, you will want to combine the information from your old system files with those system files in the new release. For example, some of these files include `/etc/inittab`, `/.profile`, `/.login`, `/etc/hosts`, and startup scripts. Using the strategy described here you can keep the new general information while adding customized details from your old files.

You should also customize your new kernel if you want to include networking or add support for AppleTalk or the Apple Tape Backup 40SC. See "Customizing Your New Kernel" at the end of this section for more information.

❖ *Note:* The following steps assume you saved your files by using the `bakchk` program. The `bakchk` program uses `cpio` to save files in a multivolume archive. To find a particular file on the 3.5-inch disk, you must insert the 3.5-inch disks one at a time in the order that the multivolume archive was made.

Follow these steps to restore files from your backup 3.5-inch disks.

1. Log in as the root user.

2. Create a directory for the old system files.

Create a new directory or navigate the directory structure until you are in the directory in which you want to restore the files. For example, to create a directory named `/oldfiles` enter

```
mkdir /oldfiles
```

3. Change directories to the newly created directory.

Change directories to the directory in which you want to restore the files. For example, enter

```
cd /oldfiles
```

4. Insert the first 3.5-inch disk of the multivolume archive into drive 0.

Insert the 3.5-inch disk you labeled as disk number 1 into drive 0. The labels you placed on the 3.5-inch disks when you saved the files will help you identify the correct 3.5-inch disk.

5. Copy the file or files from your backup 3.5-inch disks to your working directory.

If you backed up your files using `bakchk`, use `cpio` to restore the files. You can read in all files at once, or restore files one at a time.

If you want to restore many files from your back up, make sure you have enough space to restore the entire archive on your hard disk. When you ran `bakchk`, you were instructed to write down the number of bytes `bakchk` reported were required to archive the files. Use the `df` command to verify that you have this number of free bytes on your system.

- To restore all files saved on your backup 3.5-inch disks into your current working directory, enter

  ```
  cpio -iBdmuv < /dev/rfloppy0
  ```

  The flag options to `cpio` cause `cpio` to read in (`-i` flag) files from the 3.5-inch disk and place the named file or files in the working directory. The `cpio` command blocks the input (`B` flag), creates any necessary directories (`d` flag), preserves the file modification date (`m` flag), and copies the file unconditionally (`u` flag). (Normally `cpio` will not copy a file older than an existing file with the same pathname.)

- To restore a single file saved on your backup 3.5-inch disks, enter

  `cpio -iBdmuv` *filename* `< /dev/rfloppy0`

  to copy the file specified by *filename* from drive 0 into your current working directory.

  If `cpio` does not find the file on the first 3.5-inch disk, you will be prompted to insert the next 3.5-inch disk of the archive. Continue inserting 3.5-inch disks as prompted.

6. Save a backup copy of the system file you want to modify.

Keep a copy of the new system file as it was originally installed. For example, enter

```
cp /etc/inittab /etc/inittab.orig
```

to save a copy of the `/etc/inittab` file for future reference.

7. Combine the information from the old system file into the new system file.

You can combine the information from your old file into your new system file by using any method you choose. Files that you will probably need to customize include

```
.cshrc
.login
etc/fstab
etc/group
etc/hosts
etc/hosts.equiv
etc/inittab
etc/motd
etc/passwd
```

This example shows you how to use `term` to compare information in two different files. Steps to compare two files, one named `/etc/inittab` and one named `/oldfiles/etc/inittab`, are listed here.

❖ *Note:* The `term` utility must be run from multi-user mode. If you are not familiar with `term`, see *Getting Started With A/UX* for more information.

- ☐ Enter

  ```
  term
  ```

- ☐ Choose New from the File menu so that you see two windows on your screen.
- ☐ Choose Tile Horizontal from the Window menu.
- ☐ Use an editor to edit the new system file in one window while viewing the old system file in another window for comparison. For example, you might use `vi` to edit `/etc/inittab` in the Terminal 1 window while you display `/oldfiles/etc/inittab` in the Terminal 2 window, as shown in Figure 6-1.
- ☐ Use Macintosh copy and paste operations from the Edit menu to customize your new `/etc/inittab` file.

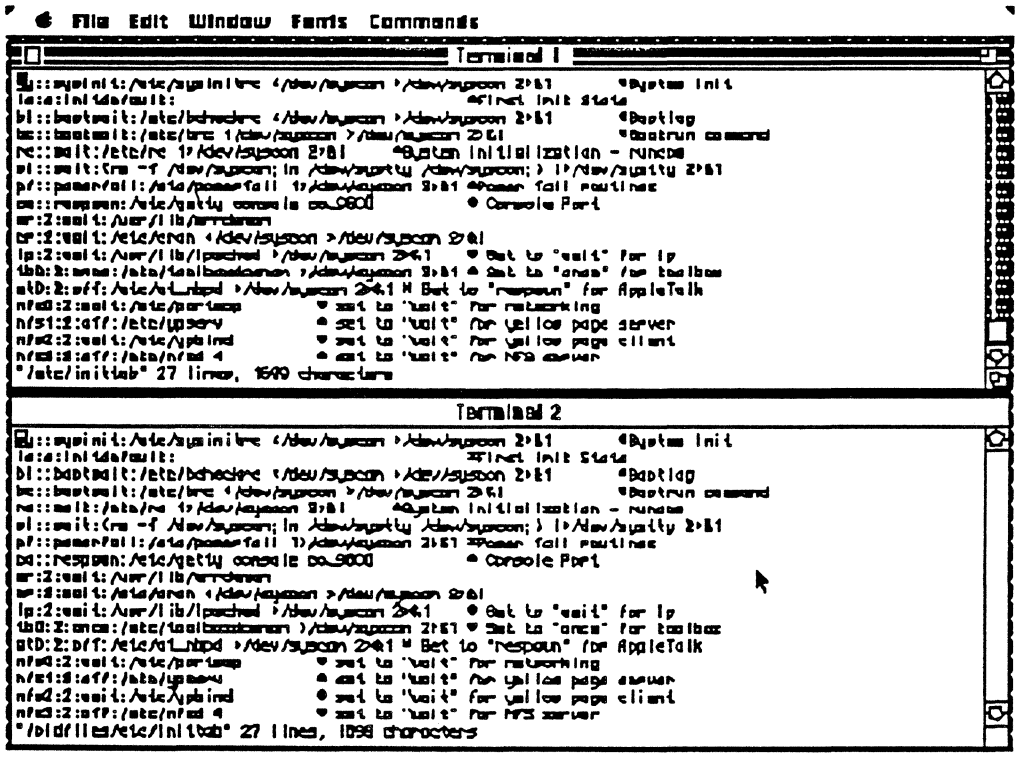

Figure 6-1
Combining information from the old `etc/inittab` file and the new `/etc/inittab` file

Customizing your kernel

If your previous A/UX system was configured for B-NET or NFS, you need to configure your new A/UX 1.1 kernel for these additions. You can use the `/etc/newunix` and `autoconfig` commands to create a new kernel. You also need to create a new kernel to include support for your tape drive if you have one.

For example, follow these steps to create a new kernel that includes support for NFS and software for the Tape Backup 40SC:

- Bring your system into single-user mode and then enter

  ```
  /etc/newunix nfs tc
  ```

  The `/etc/newunix` command creates files in `/etc/master.d` and other directories that the `autoconfig` command uses to create a new kernel.

- Create a new kernel by entering

  ```
  autoconfig -v -I -S /etc/startup
  ```

  Your new kernel is in the `/unix` file.

- Edit the appropriate files, such as `/etc/inittab` to turn on the networking daemons, and `/etc/hosts` to list network addresses.

- If your system has four or more megabytes of main memory, you should also use the `kconfig`(1m) commmand to improve system performance. Enter

  ```
  kconfig -n /unix
  NBUF=1000
  NINODE=100
  NFILE=100
  Control-D
  ```

  to optimize kernel parameters.

- Enter

  ```
  reboot
  ```

  to run your new kernel.

- After your system is up and running for two days, login as the root user and enter

  ```
  eupdate
  ```

  to update important system files in the autorecovery partitions.

See *A/UX Local System Administration* and *A/UX Network System Administration* for more information on adding peripherals to your system and customizing your system for networking.

Shutting down and restarting

In this section you'll learn how to bring A/UX back to single-user mode, safely turn off the power, and then restart A/UX. When you use the `shutdown` command, you automatically return your system to single-user mode. Your system should still be on at this point. To shut down your system completely and terminate all processes, you must use the `powerdown` command from single-user mode. The entire procedure should take between three and five minutes. In the future you must repeat these tasks when performing administration functions such as various hardware or kernel-level software installations.

Shutting down your system

The `shutdown` program broadcasts a warning to any other users on the system to save their files and log off. After a preset interval (the default is one minute), `shutdown` stops all processes, unmounts all file systems except `root` (which always remains mounted), updates the system's superblocks, and returns all control of the system to the console.

Follow these steps to shut down your A/UX system:

1. Log in as the root user on the system console.

At this point the root user's command prompt should appear on your screen.

hostname`.root #`

If you logged out since finishing the last section, log in again by entering the user name `root` in response to the `login` prompt; then enter your password in response to the `Password` prompt.

You must be logged in as the root user on the system console to run the `shutdown` command. Do not use the `shutdown` command from any terminal other than the system console.

2. Enter `shutdown` to return to single-user mode.

To start the shutdown program, enter

```
shutdown
```

The system responds by displaying a banner and the date

```
SHUTDOWN PROGRAM
Fri Nov 18 12:15:30 PST 1989
```

The system then asks if you want to specify your own shutdown delay. The shutdown delay is the interval the system will wait before beginning the file system shutdown.

You will see the prompt

```
Do you wish to enter your own delay to shutdown:
Default is 1 minute, (y or n):
```

3. Enter `n` to accept the default delay of 1 minute.

To accept the default delay of 1 minute, enter

```
n
```

Entering `y` and then entering 0 for the next prompt to specify zero minutes for the delay would hasten the shutdown procedure; however, using the default setting shows you how you can employ `shutdown` in a multi-user environment to alert other users that the system is being brought down.

In the future, if remote users log into your machine across modem connections or other communications media, you might wish to answer this prompt with `y` and enter a longer delay to shutdown, thereby giving users a greater chance of seeing the warning and saving their work before the system shuts down.

After you accept the default shutdown delay, you will see the prompt

```
Do you wish to enter your own message (y or n):
```

4. Enter `n` to accept the default shutdown message.

Accept the default shutdown message by entering

```
n
```

In the future, if you want to change the message, you can enter `y` and enter an appropriate warning. You will see a warning message on your screen; if other users were logged in, this message also appears on their terminals.

```
Broadcast Message from root (console) current date and time
SYSTEM BEING BROUGHT DOWN FOR SYSTEM MAINTENANCE

Minutes to SHUTDOWN :1
```

The system makes a sound (similar to the startup sound), indicating that it is checking internal processes. After 30 seconds, you will see another warning message:

```
Broadcast Message from root (console) current date and time
SHUTDOWN IN 30 SECS...LAST CHANCE TO LOGOUT
```

After the one-minute delay to shutdown is over, these messages appear on your console (where *x* is the SCSI ID number of the disk containing the A/UX root file system; normally 0 for an internal hard disk and 5 for an external hard disk).

```
Mounted devices are:
/dev/dsk/cxd0s0 on / type 5.2 (rw,noquota)
Unmounting file systems
/dev/dsk/cxd0s0 on / type 5.2 (rw,noquota)

****   SYSCON CHANGED TO /dev/console   ****
Killing all processes

INIT: New run level: S

INIT: SINGLE USER MODE
```

These messages inform you of the progress of the `shutdown` program. (Although the `shutdown` program goes through the process of unmounting the root file system, and even reports that it is being unmounted, `root` is integral to the operating system and can never be unmounted.)

5. Press RETURN to accept the terminal type.

The system login banner appears when A/UX is in single-user mode, and the following prompt reappears:

```
TERM = (mac2)
```

Press RETURN to accept the terminal type.

The root user's command prompt appears

hostname`.root #`

After bringing your system down to single-user mode, you can either reboot your system to restart your computer, or use the `powerdown` command to turn off your computer. Go to "Rebooting Your System" or "Powering Down Your System" depending on what you want to do.

Rebooting your system

After bringing your system down to single-user mode, you can reboot your system to restart your computer. Rebooting in A/UX is just like choosing Restart from the Execute menu in the Macintosh OS.

Warning

To protect the files on your system, never use the `reboot` command or shut A/UX down in any way until after you've brought the system to single-user mode.

Use the `sync` command before rebooting. The `sync` command writes buffers in memory to disk. You should always give this command before the `reboot` command. To reboot your computer, enter

```
sync
sync
sync
reboot
```

Your screen will go dark for a moment. Then an icon of a smiling Macintosh should appear with the words

```
Welcome to Macintosh
```

This message indicates that the system has found a Macintosh System Folder (containing the Macintosh OS) on a hard disk and has started correctly. If you have set the SASH Partition as your startup device and `sash` as your startup application, you should see either the sash window or, if you have set `sash` to automatically boot A/UX, you should see the sash automatic startup screen. If you see the sash window and want to start A/UX now, choose AutoLaunch from the Execute menu to boot A/UX.

When you see the sash automatic startup screen, `sash` counts down to zero. Unless you click Cancel, when the count reaches zero `sash` launches A/UX. To speed things up, you can press RETURN or click Go, which launches A/UX immediately.

Powering down your system

Your system should be in single-user mode before you use the `powerdown` command. If your system is not already in single-user mode, follow the directions in "Shutting Down Your System" to bring your system down to single-user mode.

Warning

To protect the files on your system never use the `powerdown` command or shut A/UX down in any way until after you've brought the system to single-user mode.

Follow these steps to power down your system:

1. Enter `sync`

You should always enter the `sync` command twice just before entering the `powerdown` command. Enter

```
sync
sync
```

The `sync` command writes buffers in memory to disk. You should always give this command before the `powerdown` command.

2. Enter `powerdown` to shut off your computer.

Although your computer has a power switch on the back of the computer, it is not recommended that you use it to turn off the computer. Instead you should use the A/UX `powerdown` command to turn the power off.

To turn your computer off, enter

```
powerdown
```

The `powerdown` command turns your system off. After the computer turns off, wait at least 30 seconds before restarting it.

3. If A/UX is on an external hard disk, turn off the hard disk.

Wait at least 30 seconds, and then turn your external hard disk back on. Continue with step 1 in the next section, "Restarting Your System."

As a rule, when bringing your system down you should turn off the external hard disk containing A/UX after you turn off the main unit of the computer. When bringing your system back up, you should turn on the external hard disk containing A/UX before you turn on the main unit of the computer.

Restarting your system

Now that you know how to bring down A/UX safely, follow these steps to restart your A/UX system:

1. Press the keyboard POWER ON key to restart A/UX.

As the computer starts, the `Welcome to Macintosh` message appears, followed shortly by the `sash` window or the `sash` automatic startup screen. If the automatic startup screen appears, let it count down to zero; at the end of ten seconds, `sash` causes A/UX to take control of the computer.

If the sash window appears, choose AutoLaunch from the Execute menu to start A/UX.

2. Enter `n` in response to the prompt to refrain from checking the root file system.

Whenever A/UX starts, you see the release ID number and information and then a message asking whether to check the root file system.

```
Do you want to check the root file system? (y or n)
[default: n]
```

If you received any error messages that were not covered in this book, enter `y` to recheck the file system. Otherwise, enter

```
n
```

(or press RETURN to accept `n`, the default answer).

The A/UX release ID number and login banner appear again, followed by the prompt

```
TERM = (mac2)
```

3. Press RETURN to accept `mac2` as the terminal type.

After you press RETURN, you receive the root user's command prompt.

hostname`.root #`

4. Enter `init 2` to resume multi-user mode.

From the root user's command prompt, reenter multi-user mode by entering

```
init 2
```

The following message appears:

```
INIT: New run level: 2
```

5. Enter `n` to refrain from checking file systems.

After you enter the `init 2` command to bring A/UX up to multi-user mode, you receive the following prompt:

```
Do you want to check the file systems (y or n) [default: n]
```

Since at this point there are no file systems other than root, enter

```
n
```

(or press RETURN to accept `n`, the default answer).

The login prompt should appear on your screen. A/UX is now fully operational in multi-user mode.

You have just finished the basic A/UX setup and installation. Before doing any more work with A/UX, though, you should look at Chapter 7, "Where to Go From Here." This chapter gives an overview of other guides in the A/UX documentation set. You need to consult these guides to perform other system administration tasks.

Chapter 7

Where to Go From Here

You now have the powerful A/UX operating system running on a Macintosh II or Macintosh IIx computer. A/UX requires system maintenance and administration. Administration tasks include bringing up the system, adding and removing users, adding and removing devices, and making and mounting file systems.

A full documentation suite accompanies A/UX 1.1. The suite includes guides and references written to help you carry out all system use and maintenance functions. This chapter points you to the guides that will help you maximize your A/UX 1.1 system.

Where to begin

This section describes the guides that you are likely to use soon after you install A/UX.

- ***Road Map to A/UX Documentation***

  This guide describes all the books written for A/UX. It comes in the A/UX Accessory Kit. You should refer to it *first* to find out about each book and where you can get the book or books that you want to use.

- ***Getting Started With A/UX***

  Every person who uses an A/UX system should read *Getting Started With A/UX*. This guide presents an introduction to A/UX and describes its features. It also describes the capabilities of A/UX and the differences between A/UX and other versions of UNIX.

  For the novice, *Getting Started With A/UX* contains a tutorial that teaches the basics of using the Macintosh and a tutorial that teaches the basics of using A/UX.

  For the experienced user this guide contains information explaining the A/UX Toolbox utilities. It also contains a glossary of terms for the entire A/UX suite.

  Read the parts of this guide that pertain to your level of expertise before undertaking other A/UX documentation.

- ***A/UX Local System Administration***

  This guide provides all the information a system administrator needs to set up and manage a single A/UX system, as opposed to a networked A/UX system.

  If you are the only user of your A/UX system, you are the system administrator. For the novice administrator this guide explains the main duties of a system administrator, such as adding accounts, making file backups, and installing upgrades. It also describes the features unique to A/UX, such as autoconfiguration and autorecovery.

- ***A/UX Network System Administration***

  This guide provides all the information an administrator needs to maintain a networked A/UX system. While a system administrator is needed for each computer that runs A/UX, one network administrator generally performs all the networking duties for several or all of the machines connected on a network.

  A/UX Network System Administration describes the procedures and commands necessary to install and keep TCP/IP and NFS networking software running smoothly on the Macintosh II or Macintosh IIx; it does *not* describe how to maintain network hardware. The guide assumes the reader has programming experience because the complex duties of network administration require a programmer's level of expertise.

Where to go for help

The following five titles are the system's main reference tools. You can refer to these manuals for information on commands, syntax, or other technical details such as limitations. Most experienced users will probably skip the user guides and will consult these references directly. The A/UX commands are available as part of the A/UX operating system and utilities. You can access information on the commands by using the `man` or `apropos` commands while running A/UX.

- ***A/UX Command Reference (A-L)***

  This reference manual contains an entry for each user command beginning with the letters *A* through *L*. The entry lists the command name, describes the syntax, and lists the associated files and commands.

- ***A/UX Command Reference (M-Z and Games)***

  This reference manual contains an entry for each command beginning with the letters *M* through *Z*. The entry lists the command name, describes the syntax, and lists the associated files and commands. This manual also includes similar entries about the game programs included in A/UX 1.1.

- ***A/UX System Administrator's Reference***

  This reference manual contains an entry for each system administration command. The entry lists the command name, describes the syntax, lists the associated files, and lists cross-references for the command. This reference includes a section of entries for device drivers and device interfaces and a section of entries for system maintenance procedures.

- ***A/UX Programmer's Reference***

  This reference manual contains information for programmers. The manual consists of entries for system calls, subroutines, file formats, and miscellaneous facilities.

- ***A/UX Reference Summary and Index***

  This guide catalogs the other reference manuals in three ways. It presents a list of all A/UX commands by function, synopses of all A/UX commands organized alphabetically, and an index of all the command reference entries based on keywords. The command synopses and list of commands by function lead you to the information in *A/UX Command Reference* and *A/UX System Administrator's Reference.* The index serves all the reference volumes.

Adding printers, modems, and other terminals

If you are planning to add a serial printer, modem, tape backup device, or another terminal to the system you just installed, refer to *A/UX Local System Administration.*

If you are planning to add an AppleTalk network printer to the system you just installed, refer to *A/UX Network System Administration.*

If you want to learn more about your Macintosh II or Macintosh IIx computer and the Macintosh OS, see the guides that came in the accessory kit with your computer.

Appendix A

Troubleshooting

This appendix contains information on support services available for A/UX. It also presents the most common problems that people have during the installation process and some steps that will usually correct each situation or information on where you can get help.

Before you look at the following sections, check that all cables are connected and that all devices you're using are turned on. If you can't continue your installation, see your authorized Apple dealer for assistance.

A/UX Support Services

To enhance the A/UX work environment, Apple Computer provides some optional support services. These services ensure that you get the help you need to keep your system working optimally — now and down the line. The sections that follow describe the available services.

What's available

You can purchase two update services:

- *A/UX Software Update Service*

  For a single fee you can receive all A/UX software updates released during a one-year period. The updates, which may be cumulative or incremental, provide product enhancements, system revisions, and software fixes. Subscribers also receive documentation containing a description of the enhancements and software fixes and installation instructions.

- *A/UX Documentation Suite Update Service*

  For a single fee you receive all revisions and additions made to one A/UX manual set during a one-year period. The manual set will be updated at the same time the software is updated.

You can also purchase access to a toll-free hotline:

- *A/UX Hotline*

  You can purchase access to a toll-free hotline staffed by A/UX support experts. The A/UX Hotline gives you access to a sophisticated support service that will enhance your already powerful A/UX environment. You'll designate two people at your site to be your A/UX Hotline contacts. These people can call for up to 5 or 15 hours of telephone support depending on the type of subscription you purchase.

  To subscribe to the hotline you must also be a subscriber to the A/UX Software Update Service. Your subscription will ensure that you always have the most up-to-date version of A/UX software.

How to Order

To obtain these services, you must complete an A/UX Support Services order form. For more information and an order form, contact your authorized Apple A/UX reseller, your Apple sales representative, or contact Apple at

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
Attn: Customer Relations
(408) 252-2775

Problems and solutions for setting up

This section presents information regarding the hardware setup process described in Chapter 1 and Chapter 2.

Blinking question mark

You see a blinking question mark when the Macintosh cannot find a System Folder containing startup files. If A/UX is not yet installed on your hard disk, this is the correct system response. For example, if you are installing A/UX to a new hard disk from either a tape cartridge or 3.5-inch disks you will see this blinking question mark when you start up the system.

Insert a 3.5-inch disk with System files on it, such as *System Setup and ReadMe.*

If A/UX is factory-installed on your hard disk, however, this prompt indicates that the hard disk has not been properly connected. If you have A/UX installed on an internal hard disk, call your Apple representative for service. If you have A/UX installed on an external hard disk, check the hardware connections to ensure that they are tight.

Macintosh desktop without a SASH Partition hard disk icon

If you received A/UX factory-installed on an internal or external hard disk, the desktop should show the SASH Partition disk icon. If the SASH Partition does not appear, your A/UX disk is not properly connected. Check the cables and Cable Terminators of the external hard disk to make sure that they are properly connected. Call your Apple representative for service.

Problems and solutions for starting up your system

If your system has not been properly configured, you may receive one of the following messages after starting up your system as described in Chapter 2.

No PMMU

If a dialog box with the message

```
No PMMU
Can NOT launch an A/UX kernel
```

appears on your screen, your system cannot start A/UX until the Macintosh II has a paged memory management unit (PMMU) in place of the address mapping unit (AMU). This must be installed by an authorized Apple dealer. Contact your authorized Apple dealer or representative for assistance.

After the PMMU is properly installed, start again at the beginning of Chapter 2, "Starting Up Your System."

Not enough memory

If a dialog box appears on your screen with the message

```
Not enough memory
```

the Macintosh does not have 2 MB of memory on the main logic board. Call your authorized Apple dealer or representative to install the required memory.

After the correct amount of memory is installed, start again at the beginning of Chapter 2, "Starting Up Your System."

Available memory

If you see the message

```
Available memory
```

and you see no further messages on your screen, check the connections on the keyboard to determine that they are tight. If the keyboard cable is loose, A/UX will not complete the startup process.

After the connections have been secured, resume where you stopped when this message appeared.

Program space too small

If a dialog box appears on your screen with the message

```
Stand Alone program space is too small
```

the RAM cache is too high for installing A/UX. If you previously used the Macintosh OS for running Macintosh applications, you probably changed the RAM cache in the Control Panel to a higher value to accommodate your Macintosh OS programs. Use the Macintosh Control Panel desk accessory to change the RAM cache so that there is at least 1 MB of free memory, which is adequate for running `sash` and starting A/UX. Refer to the owner's guide that came with your computer for instructions on lowering the RAM cache.

Problems and solutions for the update process

This section presents information regarding the update process described in Chapter 3 and Chapter 4.

Not enough space

When updating, the System Checker may display this message:

```
*** ATTENTION: Not enough space.
*** You need at least nnnn blocks in your A/UX root
    partition
*** You have only nnnn blocks available on disk n
    Quitting ...
```

You should not begin the installation process until you have gained the required number of blocks of free space. You can use `cpio` or `tar` to back up unnecessary files on 3.5-inch disks and then remove the files from the hard disk to free more space. If you have additional hard disk space available, you can also perform a nonstandard installation placing the `root` and `/usr` file systems on two disks. See Appendix B, "Non-Standard Procedures," for instructions.

Problems and solutions for the initial phase of installation

This section lists errors you may encounter during the preparation and initial phase of installation as described in Chapter 3, Chapter 4, and Appendix B, and gives you instructions on how to correct them.

Stand-Alone Shell doesn't appear after rebooting

After you install the critical root files on the hard disk and restart the computer, if the Macintosh Finder or a blinking question mark appear, make certain you set the startup device and application as described in the section, "Setting the Startup Device and Application," in Chapter 3.

Press the front of the programmer's switch to reset the computer. Restart the installation process at the beginning.

If you see the SASH Partition window or icon, open the window and launch `sash` by double-clicking the icon or by selecting the icon and choosing Open from the File menu.

Disk c0d0s0 Error

When attempting to install A/UX, you may see a message that starts

```
Disk c0d0s0 Error: Cannot select SCSI device ...
```

Check the SCSI ID number of the hard disk that contains A/UX and then use the General command in the Preferences menu in `sash` to change the SCSI ID parameter if necessary. See Chapter 5, "Getting Ready to Run A/UX 1.1," for step-by-step instructions.

Cannot mount root

If you insert a write-protected (physically locked) 3.5-inch disk or insert the disk into the wrong disk drive (on the left if you have two disk drives), the system displays a message like

```
panic: rootmount cannot mount root
```

The only recovery is to interrupt (by pressing the programmer's switch) or to turn off the computer by pressing the switch on the back then pressing the POWER ON key. When the disk is ejected, unlock it by sliding the black tab on the back of the disk down to the unlocked position.

Error checking hard disk

When the system checks the hard disk and you see an error message like

```
*** ATTENTION: Error checking hard disk.
*** Your disk may be improperly connected. Please recheck
*** all cables and be sure your hard disk has SCSI ID
*** number n.
```

you need to check three things:

- If the disk is an external hard disk, make sure you switched it on at least ten seconds before you switched on the computer.
- Check that you have given the correct SCSI ID number for the hard disk in step 10 of the section, "Launching the Installation Process," in Chapter 4.

  Turn off an external disk before turning it around to see the SCSI ID number in the SCSI ID number indicator on the back of the device.
- Check for correct cable connections. Before doing this, power down the whole system.

When you have corrected the condition that led to this message, you can restart from step 1 of the section, "Launching the Installation Process."

Could not make a file system

A new root file system needs to be created and mounted. If a file system could not be created, the system displays a message like

```
*** ATTENTION: Could not make a file system.
*** Please recheck all connections.
*** Be sure your disk has SCSI ID number n.
```

The installation procedure quits. Check the cables and verify the SCSI number. You can then restart the installation from step 1 of the section, "Launching the Installation Process."

Error mounting hard disk

If a new file system was created but the mount operation fails, the system displays a message like

```
*** ATTENTION: Error mounting hard disk.

*** Your disk may be improperly connected. Please recheck
*** all cables and be sure your hard disk has SCSI ID
*** number n.
```

The installation procedure quits. Check the cables and verify the SCSI ID number. You can then restart the installation from step 1 of the section, "Launching the Installation Process."

3.5-inch disk inserted into incorrect drive

If you attempt to use disk drive 1 (the drive on the left) rather than disk drive 0 (the drive on the right) during the installation process, the system displays the message

```
Do NOT insert floppies into drive 1. This will be your only
warning. If you have only one drive, quit now and see your
dealer immediately.
```

You can check this situation one time. If you have only one drive, that drive is not identified correctly to the system. See your dealer immediately.

Problems and solutions for installation from tape

This section lists errors you may encounter during installation from tape as described in Chapter 4 and Appendix B, and gives you instructions on how to correct them.

Tape device not recognized

During the installation from tape procedure, if you continue to see the message

```
Waiting for tape.
```

after inserting the tape cartridge, then the installation software is not able to recognize your tape device.

Enter `q` to quit the installation process. Check the following:

- ☐ You switched on the tape device at least ten seconds before you switched on the computer.
- ☐ You connected all the cables securely.
- ☐ You changed the boot device as described in "Setting the Boot Device" in Chapter 4.
- ☐ You are using the correct SCSI ID number for the tape backup device.

After you correct any problems, restart the installation process beginning with step 1 of "Launching the Installation Process."

Could not make /lost + found directory

Something has gone wrong during installation of the root files if you see the message

```
ATTENTION: Could not make /lost+found directory to optimum
size.
```

If you see this message, attempt to reinstall from step 1 of "Launching the Installation Process." If the message occurs again, see your dealer for help.

Problems and solutions for installation from 3.5-inch disks

This section lists errors you may encounter during installation from 3.5-inch disks and gives you instructions on how to correct them.

3.5-inch disk reading error

If the system or the installation procedures do not recognize the disk one of these two messages appear:

```
ERROR: Cannot read floppy.  Please verify that this is an
A/UX Installation Disk.  If trouble persists, contact your
dealer.
```

```
ERROR: Incorrect format.  Please verify that this is an
A/UX Installation Disk.  If trouble persists, contact your
dealer.
```

The system ejects the 3.5-inch disk. Verify that the disk is labeled as one of the current installation disks. If it is not, insert the correct disk. If it is the correct disk, and you insert it again and still get the message, you need a replacement disk. See your authorized Apple dealer.

Error in installation

When the installation procedures could not copy valid information from a disk that appears to be a valid installation disk, the system displays the message

```
*     *     *     *     *     *

                ATTENTION

Error in installation.  Please insert disk nn again.  If
problem persists, press q to quit and contact your dealer.
```

If you insert the disk again and continue to get the message, you need a replacement disk. See your authorized Apple dealer.

Incorrect or bad 3.5-inch disk inserted

When you have inserted a disk out of sequence or have inserted a bad disk, the system ejects the 3.5-inch disk and displays this message

```
ATTENTION:  Insert disk number nn.  This is disk number nn.

ATTENTION:  Disk sequence number (nn) is incorrect.  Please
verify that this is an A/UX Installation Disk.  If trouble
persists, contact your dealer.

WARNING:  Total number of disks inconsistent.  Assuming nn
disks.
```

The message might result from inserting an installation disk from a prior release (or from the disk being damaged). Verify that the disk inserted is labeled as one of the current installation disks. If it is not, insert the correct disk. If it is the correct disk and you insert it again and still get the message, you need a replacement disk. See your authorized Apple dealer.

Appendix B

Nonstandard Procedures

This appendix gives background information and instructions for performing a nonstandard installation of A/UX. You must have either the A/UX Tape Product or A/UX Floppy Product to perform a nonstandard installation. When you complete the installation procedures in this appendix, you need to prepare to run A/UX as described in Chapter 5, "Getting Ready to Run A/UX 1.1."

If you are updating your current system to A/UX 1.1, read the information in "Updating A/UX 1.0 to A/UX 1.1" in Chapter 3 before performing a nonstandard installation.

You should choose to do a nonstandard installation only if you have good reasons and you know what the ramifications are.

Nonstandard installation options

You have two choices for nonstandard installation: placing the `/usr` file system on a hard disk partition other than the one used by the root file system, and not filling the autorecovery partitions. The two choices are independent; you can choose either or both.

Just as you do in standard installation, you have the choice of omitting certain option files. This option is described in "Leaving Out Optional Files."

Placing the /usr file system on a separate partition

When you choose to put the /usr file system on a separate partition, you end up with an A/UX system in which the root file system is on one hard disk and the /usr file system (including the optional files) is on another hard disk.

❖ *Note:* While it is possible to put the /usr file system and the root file system on separate partitions on the same physical hard disk, it is not recommended for hard disks with 80 MB or less of capacity. To place /usr and the root file system on the same hard disk, you would need to use HD SC Setup to create custom partitions and would also need to prepare the Macintosh partition.

You might consider placing /usr on a separate partition if you are installing on a system that will be the main A/UX system for a multi-user network. In such a case, you may wish to use an internal 40 MB disk for the root file system and place the other file systems on an 80 MB disk.

As another example, you might have to place the /usr file system on a separate partition out of necessity if you do not have an 80 MB hard disk but are installing A/UX on two 40 MB disks.

Other reasons for placing /usr on a separate partition include performance and security. Performance may improve if you have separate hard disks for the two file systems. Security considerations include simpler control of file access for classes of users and improved backup strategy due to smaller and more frequent backups.

❖ *Note:* Doing the installation on two partitions requires some experience with A/UX.

If you are updating to A/UX 1.1, follow step 1 and steps 3 through 5 to place /usr and the root file system on separate partitions and on separate hard disks. If you are not updating, follow steps 2 through 5 to place /usr and the root file system on separate partitions and on separate hard disks.

1. Back up files in /usr on your root file system and remove files from /usr.

If you only want one /usr directory, you should back up your files on your root file system. You can choose to remove files in /usr from your hard disk, as you are going to install new /usr files on your second hard disk. Note that if you do not remove the files from /usr, when you mount /usr later you will not be able to access any of your original /usr files.

Go to step 3 to set up your second hard disk for the /usr file system.

2. Use HD SC Setup to initialize and partition the hard disk for the root file system.

❖ *Note:* If you are updating to A/UX 1.1, skip this step and go on to step 3.

You should have already initialized and partitioned the hard disk you will use for the root file system as described in "Preparing Your Hard Disk" in Chapter 3. You should also have installed the system folder, copied `sash` and utilities to the SASH Partition, and set the startup device and application as described in "Preparing the Macintosh Partition" in Chapter 3.

3. Use HD SC Setup to initialize the hard disk for the `/usr` file system.

Initialize the hard disk you will use for the `/usr` file system as described in "Preparing Your Hard Disk" in Chapter 3. If you are asked to name the disk, name the disk "Untitled." Follow the directions in the next step to partition the `/usr` file system.

4. Use HD SC Setup to partition the hard disk for the `/usr` file system.

Read the section "How to Create a Custom Partition" in *A/UX Local System Administration* for background information. From HD SC Setup, you should see the main HD SC Setup dialog box. Follow these steps to create a custom partition for `/usr`:

- ☐ Click the Partition button to partition the `/usr` file system.

  You will see the Partition dialog box.

- ☐ Click Custom to create a custom partition.

  You will see the Custom Partition dialog box.

- ☐ Remove the Untitled partition.

  Select the Untitled partition (click anywhere in its rectangle) then click Remove. Click OK to confirm that you want to remove the partition.

❖ *Note:* Do not remove the Mac Driver partition.

- ☐ Create a new partition.

  Click in the gray area and drag to adjust the size of the partition. Release the mouse button when you are satisfied with the size of the new partition. You will see the dialog box shown in Figure B-1. Select `Usr` as the type of partition.

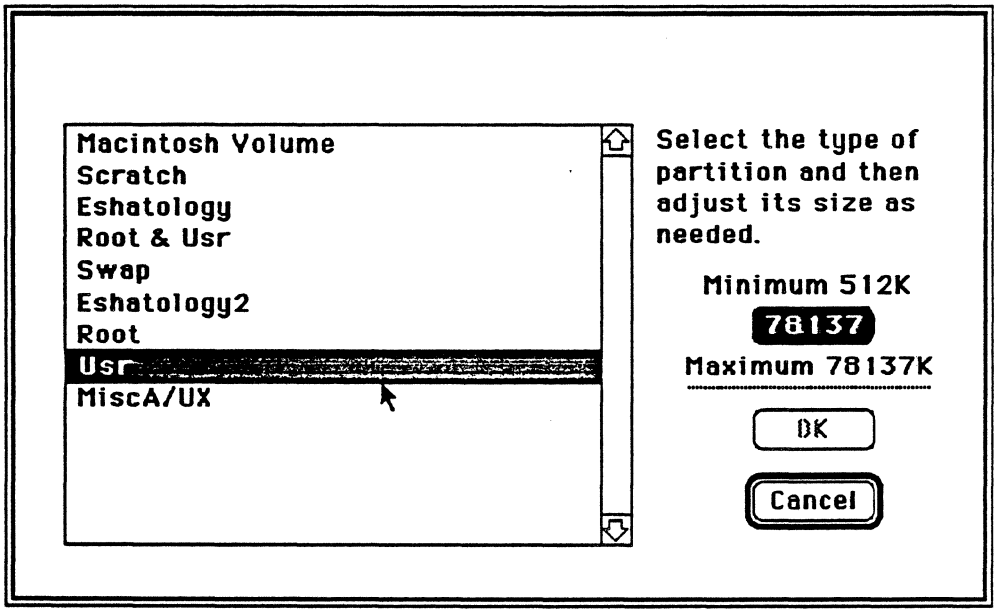

Figure B-1
Selecting `Usr` as the type of partition

- Write down the size information shown in the highlighted box on the right side of the dialog box.

  Size of `Usr` partition _____

  You will need this information later when using the `mkfs` command to make the required file system on the second hard disk.
- Click OK to accept `Usr` as the partition. You should now see the dialog box shown in Figure B-2.
- Click Done.
- Click Quit.

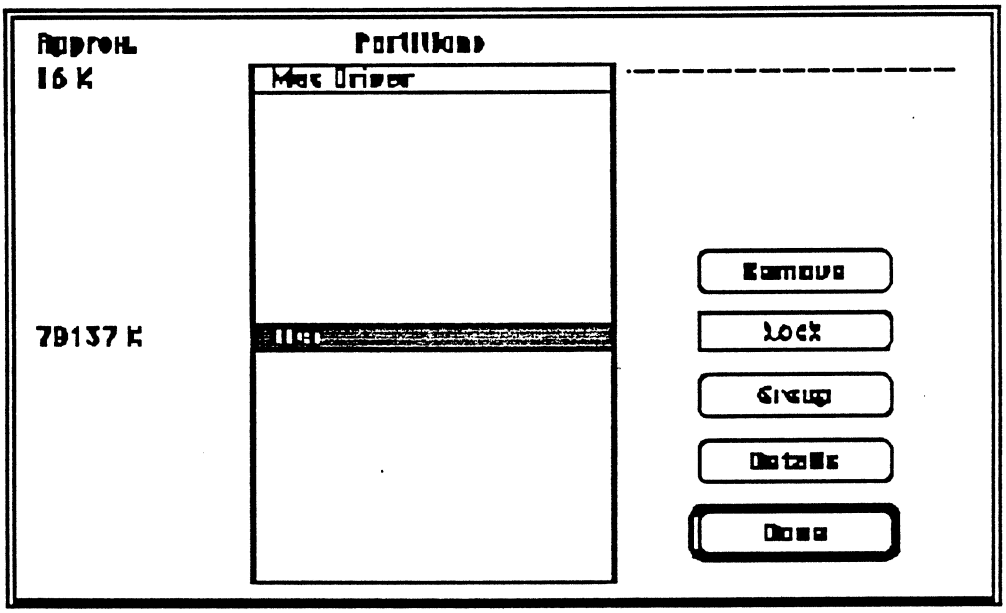

Figure B-2
The Custom Partition dialog box

5. **Complete the nonstandard installation by following the instructions in "An Overview of Nonstandard Software Installation" in this appendix.**

   During the installation procedures, you specify that you want to perform a nonstandard installation. This tells the system that you will place the `/usr` file system on a separate disk. Later you will be given a chance to make a file system on the second hard disk (with `mkfs`) and then mount it. The installation procedures will handle putting the root system on the first hard disk you specified and the rest of the A/UX system on the second disk.

   Note that, because you specified nonstandard installation, you will see the prompt

   ```
   Do you wish to fill the autorecovery partitions?
   ```

   during the final phase of installation whether or not you want `autorecovery`. Enter `y` for yes, unless you know the ramifications of not using `autorecovery` and have also prepared for them.

Omitting autorecovery

The following information describes what the autorecovery facilities are, why you might omit them, and how to omit them from the installation.

Warning

The decision to do without autorecovery should be made only by A/UX installations that already have a strongly established way of backing up and restoring their systems. Doing without autorecovery adds a good deal of additional administrative responsibility. Even the most experienced administrators should make this decision only after very careful consideration.

The autorecovery facilities are documented in *A/UX Local System Administration* and in `autorecovery`(8). These two sources also provide references to additional information.

In brief, the autorecovery facilities provide a semiautomatic way of recovering missing or damaged critical files in the root or `/usr` file systems. The intent of these facilities is to protect your system from sudden, catastrophic loss of data and to minimize the need for a technical expert to diagnose and repair system problems.

Autorecovery maintains copies of essential system files in two separate partitions. The use of redundant partitions helps ensure file recovery from certain kinds of system damage.

Autorecovery does not take the place of regular backups of your files; it should be part of a more general plan for maintaining your system security and integrity.

The main reason for doing without autorecovery is to gain disk space. If you do without autorecovery, you gain (for the current release) approximately 6 MB of disk space.

You can make use of the space that you gain by not filling the autorecovery partitions in one of two ways. If you simply choose not to fill the partitions during installation, you gain two 3 MB partitions called Eschatology and Eschatology 2. To use these partitions you must use the `pname`(1) command to associate each partition with a device. See `pname`(1) and *A/UX Local System Administration* for more information. You can use the `dp`(1) command to display the names and sizes of these partitions.

If you are not going to fill the autorecovery partitions and you want to remove these partitions physically, you can do so by using HD SC Setup to prepare your hard disk before you begin the installation procedure. These steps summarize how to do this.

- Select A/UX Setup to create the standard partitions.
- Select Custom from the Partition dialog box.
- Remove the Eschatology, Eschatology 2, or both partitions. See *A/UX Local System Administration* for information on creating or increasing partition sizes. Do not decrease the size of any partitions. Do not remove any partitions other than Eschatology or Eschatology 2.

To install an A/UX system without autorecovery, follow the directions in "An Overview of Nonstandard Software Installation."

During the installation procedures, you specify that you want to perform a nonstandard installation. At the final part of the installation you specify that you want to omit autorecovery by entering `n` when you see the prompt

```
Do you wish to fill the autorecovery partitions?
```

The autorecovery partitions of your new system will not be filled.

Note that because you specified nonstandard installation you will be asked about the other nonstandard installation; that is, you will be asked if you want to put the `/usr` file system on a separate partition. Enter `n`, unless you have also prepared for that choice.

Leaving out optional files

You can decide to leave out certain optional files when installing A/UX. The two groups of files are the online reference manual pages (stored in the directory `/usr/catman`), which provide on-line help for the A/UX system, and a collection of games (in `/usr/games`).

If you choose to install these files, keep in mind that you can easily remove them from the system later if you decide that you don't need them. If you choose to omit installing these files then later decide that you need files you did not install, you can bring them in, but at the cost of additional work, by using the procedures described in Appendix C, "Reusing the Installation Media."

If you are updating to A/UX 1.1 and the `syschk` program reported that you did not have sufficient space to install the optional files, you can choose to omit them.

During the second phase of installation you are given the choice of leaving out `/usr catman` and `/usr/games`. Follow the directions in "An Overview of Nonstandard Software Installation" to install A/UX and omit one or both of the optional files.

The on-line reference manual files

On-line manual pages (also referred to as "man pages") are considered part of A/UX and there are only a couple of reasons you might leave these out. Here are two possibilities:

- You are building a turnkey system based on A/UX, in which the user always interacts with the front end and never gets into the A/UX system. Therefore, the user does not need and will not need on-line help for A/UX commands.
- You are installing a system that will tie into a network that has a "man pages" file server. These files are a little over 4 MB in the current release.

The `game` files

The complete games require just under 1 MB. Remember that you can install them all, and then remove the ones you do not care to have. The games are described in volume 2 of *A/UX Command Reference.*

An overview of nonstandard software installation

The A/UX Tape Product consists of a set of 3.5-inch disks containing the tools necessary to install the A/UX software on a hard disk and a single streaming tape cartridge containing the A/UX software. The A/UX Floppy Product consists of the same set of tools and A/UX software, entirely on 3.5-inch disks.

Installing the A/UX software from tape or 3.5-inch disks is done in two phases: an initial phase and an installation phase. Figure B-3 illustrates this two-phase installation process.

- In the initial phase you specify whether you will install from tape or disks and whether you will perform a standard or nonstandard installation, and you provide SCSI identification number or numbers. You then start the first part of the installation process, which copies root files onto your hard disk. This phase takes about 20 minutes.
- In the installation phase you copy the rest of the A/UX software onto the hard disk. If you are installing from tape, this phase requires about 75 to 80 minutes for a complete installation and once begun, it can proceed unattended, except for a brief interruption to set up `/usr`. If you are installing from 3.5-inch disks, this phase requires about two hours for a complete installation, and someone must insert disks during the process.

If you are installing from tape, follow the installation procedures in "Launching the Installation Process" and "Installing from Tape Cartridge." If you are installing from 3.5-inch disks, follow the installation procedures in "Launching the Installation Process," and "Installing from 3.5-inch Disks."

What you need now

Before you begin, you must have prepared the disk by following the procedures in "Placing the `/usr` File System on a Separate Partition" or "Omitting Autorecovery," according to the nonstandard installation option or options you have chosen. You must know the SCSI ID number of the hard disk on which you will install the system. If you are installing from tape, you must also have the SCSI ID number for the tape drive.

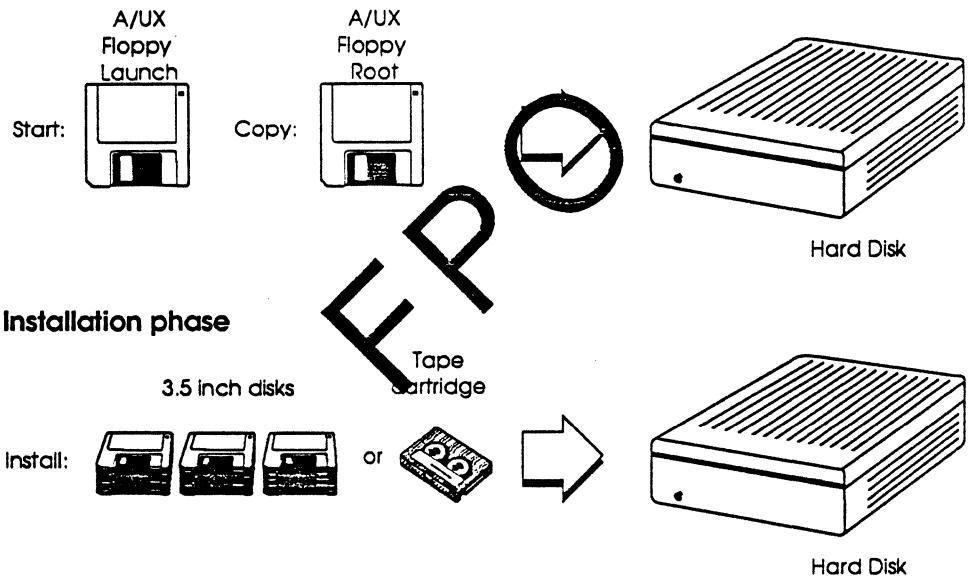

Figure B-3
The Installation process

Have the following items available for the initial phase:

- *A/UX Floppy Launch,* a disk that contains a special A/UX stand-alone shell, a kernel, and a few utilities.
- *A/UX Floppy Root,* a disk that contains a mountable A/UX file system. This disk is not readable from the Macintosh OS.

Have *either* of the following items available for the appropriate installation phase:

- If you purchased the A/UX Tape Product, the streaming tape cartridge labeled *A/UX Release 1.1* that contains the complete A/UX file system.
- If you purchased the A/UX Floppy Product, a set of 3.5-inch disks that contain the A/UX software, labeled *A/UX Installation Disk 1* through *A/UX Installation Disk 26,* followed by an index disk labeled *File Index.*

Launching the installation process

In this initial phase you will use the 3.5-inch disks *A/UX Floppy Launch* and *A/UX Floppy Root* to begin the installation process. If you receive an error message anytime during installation, refer to Appendix A, "Troubleshooting."

1. Insert *A/UX Floppy Launch* into the 3.5-inch disk drive.

Always use 3.5-inch disk drive 0 (which is usually the drive on the right, if your system has more than one). You should see the A/UX Floppy Launch window shown in Figure B-4. If you do not see this on your screen, double-click the A/UX Floppy Launch disk icon.

Important

Start up the `floppy sash` application on the 3.5-inch disk. Do not start up the `sash` application on the hard disk.

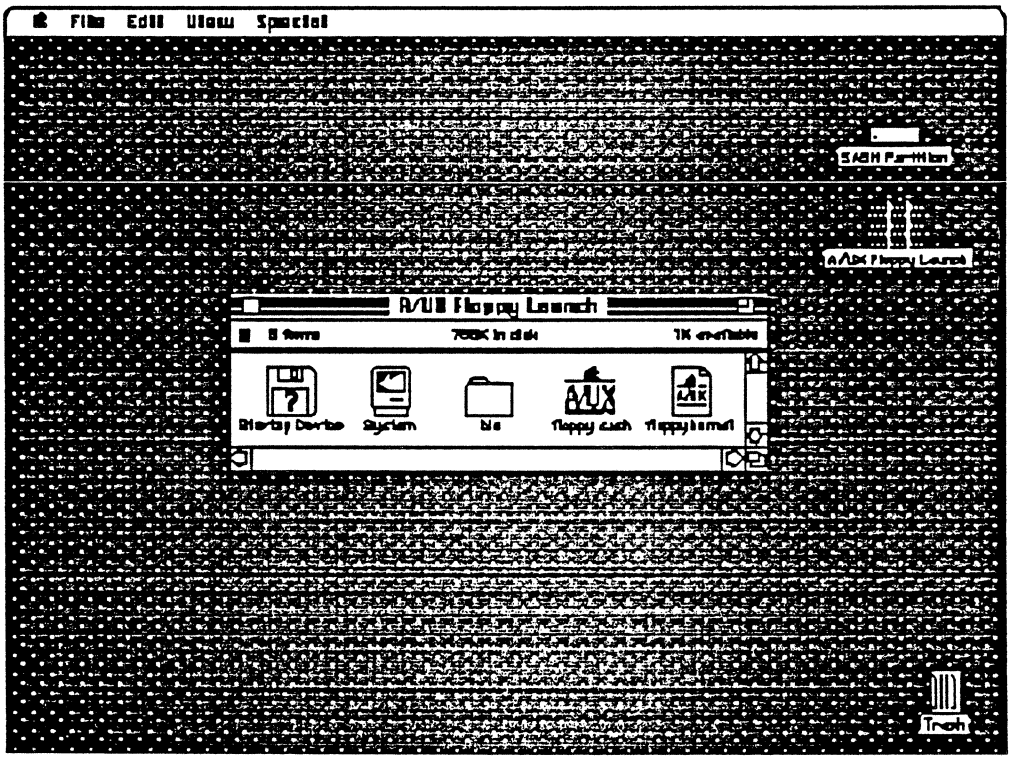

Figure B-4
A/UX Floppy Launch window

2. Double-click the `floppy sash` application icon.

Double-click the `floppy sash` application icon in the A/UX Floppy Launch window. Figure B-5 illustrates the `floppy sash` application icon.

Figure B-5
The `floppy sash` application icon

The `floppy sash` Stand-Alone Shell window appears, as shown in Figure B-6 Ignore the message `chroot failed`. If you also see the message

```
Disk c0d0s0 Error:  Cannot select SCSI device ...
```

ignore this message. Verify that the next line reads `floppy sash#`. If the word *floppy* is not there, choose Quit from the File menu and return to step 1.

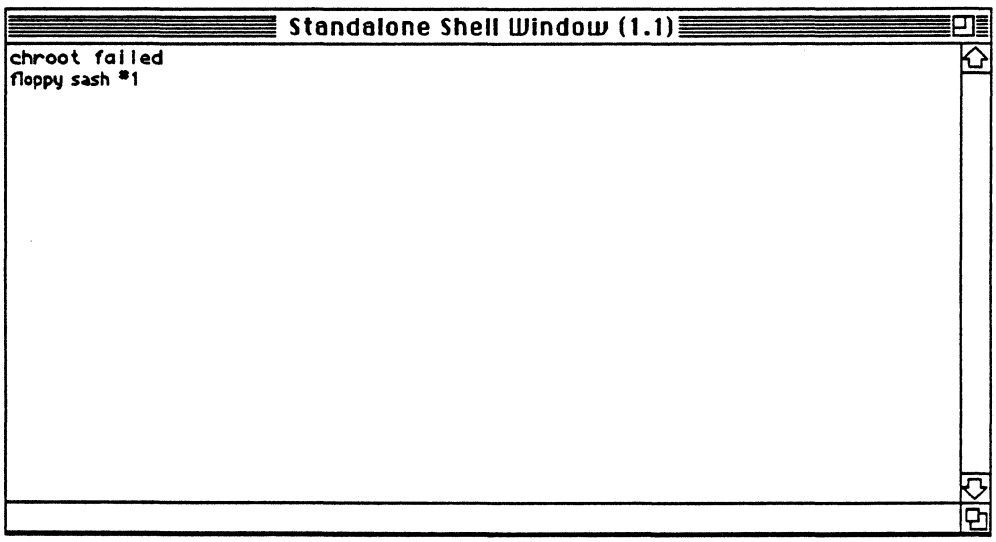

Figure B-6
The `floppy sash` Stand-Alone Shell window

3. Launch the installation procedure.

Do either of the following:

- Choose AutoLaunch from the Execute Menu.
- Enter (at the prompt `floppy sash#`)

  `autolaunch`

  The system reads information from the 3.5-inch disk and begins the installation process. After a few moments, a box appears with a message like

  ```
  Ready to Launch A/UX

  Please insert a diskette with an A/UX
  filesystem on it.
  ```

  and the system ejects the *A/UX Floppy Launch* disk.

4. Remove the disk labeled *A/UX Floppy Launch*.

Remove the *A/UX Floppy Launch* disk now and store it in a safe place.

5. Insert the disk labeled *A/UX Floppy Root*.

Important

The disk must be writeable. If the disk has been physically locked to protect the data, unlock it by sliding the colored tab away from the edge of the disk. When the disk is writeable, the tab covers the hole in the disk.

The system boots A/UX from the 3.5-inch disk. The screen flashes once and you see the A/UX Initial Console Emulator window. You will see messages displaying copyright and release ID information.

6. After reading system messages, press RETURN.

The screen displays a variety of information. After a short while, the screen displays some messages regarding the assumptions made about your installation. Your screen should look similar to this

```
erase is DELETE

Welcome to the A/UX Release 1.1 installation procedure.

This procedure assumes the following:

* You have an Apple HD 80SC (or equivalent) hard disk
  attached to the system and turned on.

* Your hard disk has previously been initialized and
  partitioned for A/UX (as by using the Apple HD SC Setup
  utility).

* You plan to install all files in the root file system
  (possibly excluding /usr) at this time. (Use cpio(1) to
  add only selected files.)

* If you are installing from tape, you have an Apple Tape
  Backup 40SC unit attached to the system and turned on.

* Optional: If you are updating an existing A/UX system to
  release 1.1, you should have run the syschk utility to
  produce a report of the system files you have
  personalized on your file system.  You should also have
  backed up these files as appropriate.

If your system does not match these assumptions, or if you
have any questions, enter q to quit now and refer to the
A/UX Installation Guide for more information.

Otherwise press RETURN to begin the installation [q to
quit]:
```

The message `erase is Delete` reminds you that during the following installation procedures, you can correct your typing using the DELETE key, so long as you have not pressed RETURN.

❖ *Note:* Any time you are given a prompt on the screen, you can enter `q` to quit from the installation procedure. However, if you do so, you will have to start the installation procedures over starting with step 1 of this section. If you choose to quit, the system exits you from the installation procedures and shuts down your system.

- ☐ Enter `q` if you are not prepared to proceed with the installation procedure.
- ☐ Press RETURN if you are ready to proceed.

7. Enter n to choose nonstandard installation.

You will see a message like

```
By default, this program will use the standard A/UX
configuration for installing files.  That is, all files
will be installed onto a single hard disk partition, and
autorecovery partitions will be filled.  If you wish to use
a separate file system for /usr, or do not wish to make use
of autorecovery, you must choose the non-standard
configuration.

Do you wish to accept the standard A/UX configuration?

[y/n, default=y]
```

Enter `n` to do the nonstandard configuration. Doing this tells the system you will not use autorecovery or you intend to use a separate file system for `/usr`.

8. Press RETURN to verify that you will perform a nonstandard installation.

You will see additional information displayed on your screen followed by the message

```
Do you still wish to use the non-standard A/UX
configuration?

[y/n/q, default=y; q to quit now:]
```

The nonstandard installation allows you to place the `/usr` file system on another hard disk and/or to not allocate space for `autorecovery`. Press RETURN to perform a nonstandard installation.

9. Specify whether you will install from tape or disks.

You will see a message like

```
If you will be installing A/UX Release 1.1 from floppies,
please enter 'F' at the prompt. If you will be installing
from tape, please enter 'T'
```

Enter `T` or `F`, if you are installing from tape or 3.5-inch disks, respectively. If you are installing from 3.5-inch disks, proceed to step 11.

10. If you are installing from tape, enter the SCSI device number of the tape drive unit.

You will see a message like

```
Please enter the SCSI ID number of your tape drive [0-6]:
```

❖ *Note:* Your Tape Backup 40SC should be on when you answer this prompt. If you have not already powered on your tape device, do so now.

Enter the SCSI ID number assigned to your tape unit, the Tape Backup 40SC. (Normally, the number is 1. You can check by looking at the back of your unit.) *It is very important to enter the correct number.*

11. Enter the SCSI device number of the hard disk on which you are installing the A/UX software.

You will see a message like

```
Please enter the SCSI ID number of the disk onto which you
will be installing A/UX [0-6]:
```

Enter the SCSI ID number assigned to the hard disk on which you will install A/UX. If you are going to place `/usr` on a separate partition, enter the SCSI ID number of the hard disk on which you will install the root file system.

The internal drive is set to 0 as shipped. If you are installing on an external hard disk, the number is originally set to 5 as shipped. If you have more than one SCSI device, make sure that each SCSI device has a unique SCSI ID number. Verify the SCSI ID numbers of all your SCSI devices by checking the window at the back of the device. *It is very important to enter the correct number.*

12. Confirm the SCSI ID number or numbers.

If you specified tape installation, you will see a message like

```
Please verify and confirm the following:
 Tape drive is SCSI ID m
 A/UX will be installed onto hard disk SCSI ID n
Enter y to confirm, n to change, q to quit:
```

If you specified 3.5-inch disk installation, you are queried only about the hard disk SCSI ID number.

- Enter `q` if you are not prepared to proceed with the installation procedure.
- Enter `n` if the SCSI ID number or numbers are incorrect. You will be prompted to reenter the SCSI ID number or numbers.
- Enter `y` if the SCSI ID number or numbers are correct.

  The system now performs initial checks to ensure that the hard disk is available, has sufficient space, and has a valid file system. You may be asked to respond during these checks if the system has problems or finds unexpected information present.

  If you are installing on a hard disk that has been initialized and partitioned (using the procedures in "Preparing the Hard Disk" in Chapter 3), go to step 13. If you are installing over an existing system (doing an update or reinstalling for some reason), proceed to step 14 instead.

❖ *Note:* If you are installing on a disk that has been used for A/UX and repartitioned, but not reinitialized, you may get the message shown in step 14.

13. Complete the appropriate steps if you are installing onto a newly initialized hard disk.

If the disk has been recently initialized and partitioned, you will see a message like

```
*****   ATTENTION   *****

Your hard disk does not contain a valid A/UX root file
system.  In order to install A/UX, it will be necessary to
make a new file system.

WARNING: Creation of a file system will destroy any A/UX
data which might be on your disk.  If you suspect that
there may be useful data on this disk, DO NOT make a new
file system.  Enter q to quit now and get help.

This procedure will NOT harm your Macintosh partition.

Should a new file system be created? [y/q]
```

This is the beginning of the installation procedure. You can continue if you are ready to create a new file system and begin the installation or quit if you want to start the installation process over at a later time.

- Enter `q` if you do not want to create a new file system at this time. This exits you from the installation procedure.
- Enter `y` to create a new file system. You will see the message

  ```
  Making and mounting root file system ...
  ```

After a few moments, you will see the message

```
Ready to install critical root files onto your hard disk.
Please wait ...
```

The system now copies the root files from the *A/UX Floppy Root* disk. This process takes 5 to 7 minutes. After successful transfer of the root file system, you will see the message

```
Preparing to reboot from your hard disk ... Done
```

Your system now reboots. The screen flashes, the smiling Macintosh icon appears, and the *A/UX Floppy Root* disk is ejected. Remove the disk and put it in a safe place. You should see the Stand-Alone Shell window again. If you do not see the Stand-Alone Shell window, see Appendix A, "Troubleshooting."

If you are installing A/UX on a hard disk with SCSI ID number 0, then proceed with the installation by typing `autolaunch` at the `sash#` prompt. A message about Phase II of the installation will appear. Proceed to "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

If you are installing A/UX on a hard disk other than SCSI ID number 0 or if you see the message `chroot failed`, then you must change the boot disk as described in "Setting the Boot Device." Go to "Setting the Boot Device" now and then proceed to either "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

14. Complete the appropriate steps if you are updating a previously used disk.

If you have previously used your disk for A/UX and you are doing an update, a root file system already exists. Or, if you have previously attempted an installation, a root file system may be left over from that attempt. (You may also get this message if you have repartitioned a disk previously used for A/UX without having reinitialized it.) When the installation procedure detects the presence of a root file system, you see a warning message like

```
Your disk appears to contain a valid A/UX file System.
Under normal conditions, this disk should be mounted to
continue the installation.

HOWEVER: If you have any doubts about the validity of this
file system (i.e. fsck and/or autorecovery have been
unable to repair your system), you should not use this
file system (but make a new one).

OK to use the existing file system? [y/n]
```

This message indicates that a root file system exists on your disk. If you did not know there was an A/UX file system on this disk, you should first verify that you are installing on the correct disk. In this case, enter `q` to exit the installation procedure.

If you are updating a previous A/UX release to A/UX 1.1, you should be able to use the existing file system. You should consider making a new file system only if you are not sure that the existing file system is valid.

You have two choices: to use the existing file system or to not use the existing file system. Both choices are described below.

- **Enter `y` if you want to use the existing file system, updating its contents.**

  If you are doing an update, you will overwrite the existing A/UX system files. (Your user files remain intact; not everything is replaced or overwritten.)

  After entering `y`, you will see the message

  ```
  Ready to install critical root files onto your hard disk
  ```

  You will then see an additional message

  ```
  *****   WARNING   *****

  This procedure WILL OVERWRITE certain critical system files
  in the root file system with their initial (installation)
  values.

  If this is not acceptable, enter q to quit now.
  Otherwise press RETURN to install these root files [q to
  quit]:
  ```

  This is the beginning of the installation procedure. Proceeding past this point replaces any existing system files on the disk. You can continue if you are ready to install or quit if you want to start the installation process over at a later time.

  - ☐ Enter `q` if you want to exit from the installation procedure.
  - ☐ Press RETURN to update your system files. You will see the message

    ```
    Please wait ...
    ```

    The system now copies the root files from the *A/UX Floppy Root* disk. This process takes 5 to 7 minutes. After successful transfer of the root file system, you will see the message

    ```
    Preparing to reboot your hard disk ... Done
    ```

    Your system now reboots. The screen flashes, the smiling Macintosh icon appears, and the *A/UX Floppy Root* disk is ejected. Remove the disk and put it in a safe place. You should see the Stand-Alone Shell window again. If you do not see the Stand-Alone Shell window, see Appendix A, "Troubleshooting."

If you are installing A/UX on a hard disk with SCSI ID number 0, proceed with the installation by typing `autolaunch` at the `sash#` prompt. A message about Phase II of the installation will display. Proceed to "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

If you are installing A/UX on a hard disk other than SCSI ID number 0 or if you see the message `chroot failed`, then you must change the boot disk as described in "Setting the Boot Device." Go to "Setting the Boot Device" now and then proceed to either "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

- **Enter `n` only if you want to overwrite the existing file system.**

  You should enter `n` only if you want to remake the existing file system. This will overwrite the existing file system and replace it with the new file system. If you are updating your previous A/UX system, you probably do not want to enter `n`.

  If you have repartitioned your old system, you may get this message because the installation procedure may detect part of the leftover, invalid file system. In this case, the existing file system is not complete. Enter `n` to make a new, valid file system.

  After entering `n`, you will see the message

```
WARNING: Creation of a file system will destroy any A/UX
data which might be on your disk. If you suspect that there
may be useful data on this disk, DO NOT make a new file
system. Enter q to quit and get help.

This procedure will NOT harm your Macintosh partition.

Should a new file system be created? [y/q]
```

  This is the beginning of the installation procedure. You can continue if you are ready to install or quit if you want to start the installation process over at a later time.

  - ☐ Enter `q` if you do not want to create a new file system now. This exits you from the installation procedure.
  - ☐ Enter `y` to create a new file system. You will see the message

```
Making and mounting root file system
```

    After a few moments you will see the message

```
Ready to install critical root files onto your hard disk
Please wait ...
```

    The system now copies the root files from the *A/UX Floppy Root* disk. This process takes 5 to 7 minutes. After successful transfer of the root file system, you see the message:

```
Preparing to reboot your hard disk ... Done
```

Your system now reboots. The screen flashes, the smiling Macintosh icon appears, and the *A/UX Floppy Root* disk is ejected. Remove the disk and put it in a safe place. You should see the Stand-Alone Shell window again. If you do not see the Stand-Alone Shell window, see Appendix A, "Troubleshooting."

If you are installing A/UX on a hard disk with SCSI ID number 0, then proceed with the installation by typing `autolaunch` at the `sash#` prompt. A message about Phase II of the installation will appear. Proceed to "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

If you are installing A/UX on a hard disk other than SCSI ID number 0 or if you see the message `chroot failed`, you must change the boot disk as described in "Setting the Boot Device."

Setting the boot device

If you are installing A/UX on a hard disk other than SCSI ID number 0, you must set the SCSI ID number you want to boot from before continuing with installation. (If you are installing on SCSI ID number 0, you can skip this step and go on to either "Installing From Tape Cartridge" or "Installing from 3.5-inch Disks.")

1. Choose General from the Preferences menu.

Place the pointer on Preferences in the menu bar at the top of the screen. Press the mouse button so that Preferences is highlighted. Drag down until the General command is highlighted, as shown in Figure B-7. Then release the mouse button.

The General dialog box appears, as shown in Figure B-8.

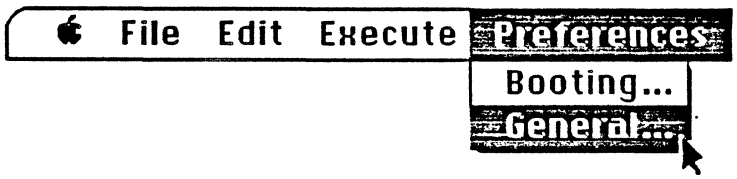

Figure B-7
Choosing General

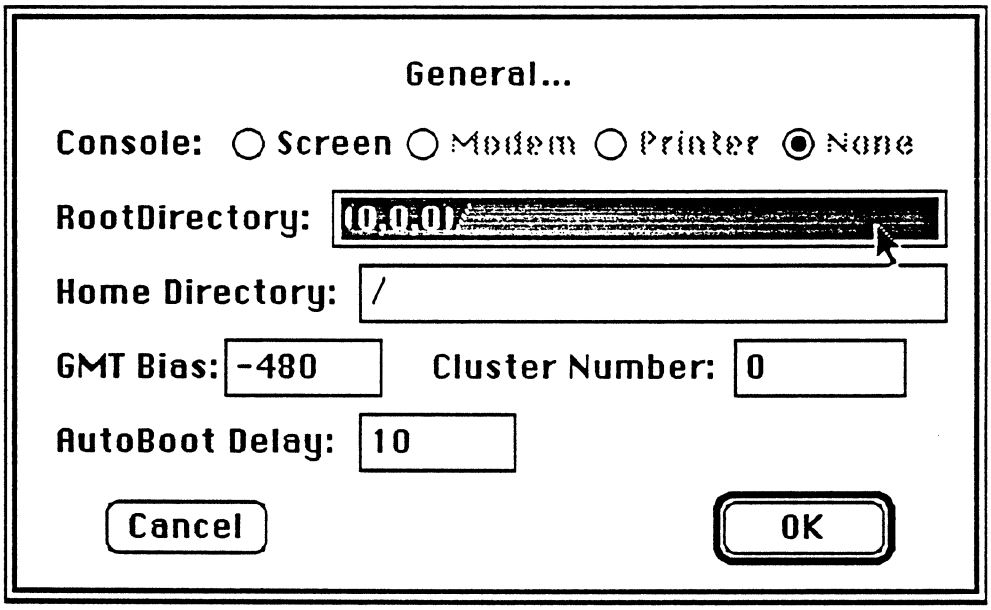

Figure B-8
The General dialog box

2. Change the SCSI ID parameter in the RootDirectory box.

You use the RootDirectory box to identify the disk from which `sash` starts A/UX. This box contains three parameters. The first parameter identifies the SCSI ID number of the disk that contains the startup files. This parameter is set to 0 by default for installation from tape or 3.5-inch disks.

To change the SCSI ID number, drag over the first 0 in the RootDirectory box to select the parameter, as shown in Figure B-9. Type the SCSI ID number of the hard disk on which you are installing A/UX.

For more information other RootDirectory parameters, see *A/UX Local System Administration.*

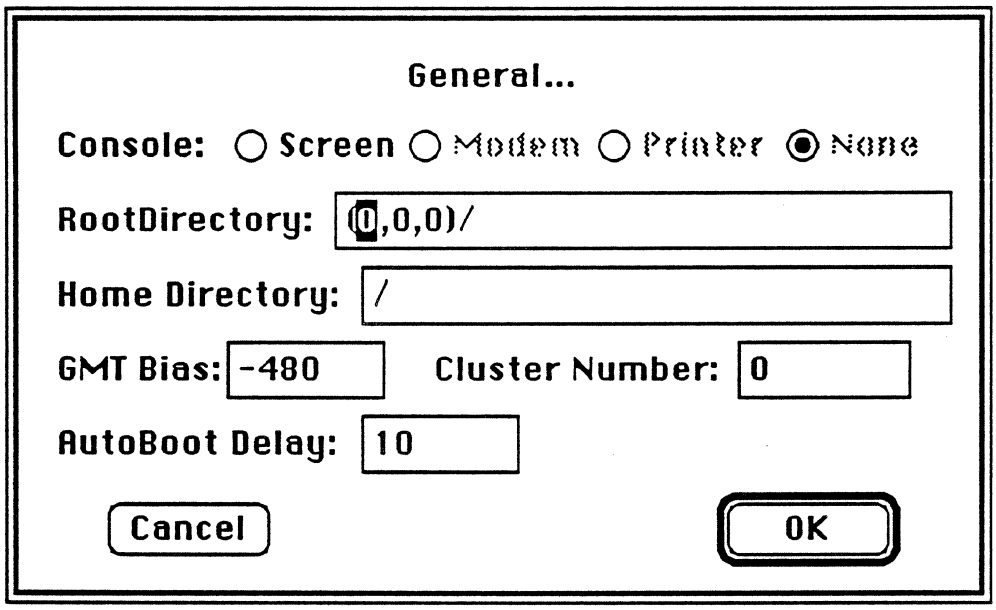

Figure B-9
Changing the SCSI ID number

3. Click OK.

Click OK to accept your changes.

4. Choose Restart from the Execute menu.

You must choose Restart from the Execute menu for the changes you just made to take effect. The system restarts and you will again see the Stand-Alone Shell window. If you do not see the Stand-Alone Shell window, see Appendix A, "Troubleshooting."

5. Enter `autolaunch` at the `sash#` prompt.

A message about Phase II of the installation appears. Proceed to "Installing From Tape Cartridge" or "Installing From 3.5-inch Disks."

Installing from tape cartridge

You are now ready to begin final installation of A/UX. After you respond to a few prompts, the installation files are copied from tape, which can proceed unattended.

You should know how to use your Tape Backup 40SC before attempting installation. Refer to *Apple Tape Backup 40SC Owner's Guide* if you have any problems.

1. Read messages and press RETURN to proceed.

You will see messages like

```
erase is DELETE

Welcome to Part II of the A/UX cartridge tape installation
procedure. The next step will involve bringing all of A/UX
onto your hard disk from archives stored on the cartridge
tape.


You may not interrupt this procedure except at designated
points.
To re-start after an interruption, type the command
"/installer".

Press RETURN now to continue [enter q to quit]:
```

Note that you should not interrupt the installation process (except at designated points) once you begin. However, should you interrupt the installation process, see "Restarting From Tape After Interruption" at the end of this section.

Later you will be given the opportunity to interrupt the procedure at one point to prepare a second hard disk for installation of the `/usr` file system. If you are doing either kind of nonstandard installation (separate `/usr` file system or omitting `autorecovery`), press RETURN.

2. Choose optional files.

At this point, you are given the choice of installing the optional files. The system displays a message like

```
By default, this procedure installs /usr/catman and
/usr/games.  You may choose to install only a subset of
these files if desired.

Install both (catman and games)? [y/n, default=y]:
```

- Enter `y` if you want to install both sets of optional files.
- Enter `n` if you do not want to install both sets of optional files. The system displays the size of the optional files with two messages like

  ```
  /usr/catman requires approximately nnnn Kbytes.
  /usr/games requires approximately nnnn Kbytes.
  ```

  The system then gives you a choice for each of the two sets of optional files:

  ```
  Install /usr/catman? [y/n]:
  Install /usr/games? [y/n]:
  ```

  Enter `y` or `n` to accept or reject each of the two choices.

3. Insert the tape cartridge.

You will see the prompt

```
Waiting for tape
```

if you have not already inserted the tape cartridge. Insert the tape cartridge now if you have not already done so. After you insert the tape cartridge, the red light on the tape drive will come on for a while. If the prompt `Waiting for tape` continues to appear on your screen, then the installation software is not able to recognize your tape device. Enter `q` to quit now, and see Appendix A, "Troubleshooting" for information on how to recover.

4. Copy files from tape.

You will see messages like

```
Ready to install basic root files.
This will take about nn minutes."
Please wait, installation in progress.
```

If you leave the system unattended during the tape copy process, be sure to protect the copy process from interference. If the process is stopped before completion, you must start again beginning with step 1 of "Launching the Installation Process" in Chapter 4. Copying the root files takes 15 to 20 minutes.

5. Specify whether you want `/usr` on a separate partition.

When the root files have been copied, you are given the opportunity to install the `/usr` file system on a separate hard disk. (During the final part of installation you will be given the opportunity to omit `autorecovery`).

```
ATTENTION: Ready to install basic /usr files
This will take about nn minutes.
Do you wish to install these files on a separate usr file
system? [y/n]
```

- **Enter `n` if you do not want to install a separate `/usr` file system.**

  The installation continues:

  ```
  Please wait, installation in progress.
  ```

  When the `/usr` files have been copied, proceed to step 6.

- **Enter `y` if you want to install a separate `/usr` file system.**

  If you enter `y`, you will see the message

  ```
  If you are using an external hard disk for the /usr
  partition, be sure it is plugged in and turned on.  Make a
  file system using mkfs (if necessary), then mount the new
  file system on /usr.  When the file system is mounted,
  continue the installation with the command "/installer".

  *      *      *      *      *      *      *      *
                          CAUTION
  Control of the installation procedure has temporarily been
  released by the installer program.  However, certain
  critical files have not yet been installed.

  Do not attempt to use A/UX until you have finished the
  installation.  Rather, make and mount the /usr file system
  quickly and return to the installation program by entering
  the command:  "/installer".  Do not reboot at this time.

  Tape is properly positioned to continue installation where
  it left off. Tape will not be rewound. In order to continue
  properly, do not rewind the tape.

  Press RETURN when you have read and understand this
  caution.
  ```

  At this point the installation procedure stops so that you can make the file system on the other hard disk and mount it. Before doing so, note the command to be used to return to the installation. Refer to `mkfs`(1M) and `mount`(1M) for more information on making and mounting a file system.

  Use `mkfs` to make the file system. You will need the size information that was previously returned by HD SC Setup when you partitioned the disk. You wrote this information down in step 3 of "Placing the `/usr` File System on a Separate Partition."

- ☐ Make the usr file system. You must double the number returned from HD SC Setup. For example, if HD SC Setup reported 78137, the `mkfs` command is

  ```
  mkfs /dev/dsk/c4d0s2  156274
  ```

  This makes the `/usr` file system on the hard disk with SCSI ID number 4. The size value (156274) is calculated by using the value returned by HD SC Setup and multiplying this value by 2. If you are using an Apple hard disk, you do not need to supply any other options to the `mkfs` command; the default values are correct.

- ☐ Mount the usr file system with a command similar to this

  ```
  mount /dev/dsk/c4d0s2   /usr
  ```

- ☐ Enter

  ```
  /installer
  ```

  to return immediately to the installation procedures. The installation procedures will continue with a message like

  ```
  erase is DELETE

  Welcome back to Part II of the A/UX cartridge tape
  installation procedure.

  You may not interrupt this procedure except at designated
  points. To restart after an interruption, type the command
  "/installer".

  Press RETURN to continue [enter q to quit]
  ```

- ☐ Press RETURN to continue with the installation and install the `/usr` files.

  After this message displays, you will see other messages like

  ```
  Continuing installation with the basic /usr files

  ATTENTION: Ready to install basic /usr files
  This will take about nn minutes.
  Please wait, installation in progress.
  ```

  The system continues with the installation process. Copying the `/usr` files takes about 35 minutes.

6. Read messages.

If you chose to install optional files, after the `/usr` files are copied you will see another message like

```
ATTENTION: Ready to install /usr/catman and /usr/games
(tape archive xxxx).

You have chosen to install: xxxx, ...
Please wait, installation in progress.
```

Copying all optional files requires about 20 minutes.

When the copy process is complete, you see a message like

```
Finished with installation.

Activating closeout routine.  This routine performs several
important functions necessary to return control to A/UX.
```

You will now see one final prompt

```
Do you wish to fill the autorecovery partitions? [y/n]
```

7. Enter n to omit filling the autorecovery partitions.

❖ *Caution:* If you physically removed the autorecovery partitions with HDSC Setup, you must answer n.

- Enter n if you do not want to fill the autorecovery partitions.
- Enter y if you want to fill the autorecovery partitions. You will see the messages

```
Making links ... Done
Filling autorecovery partitions ... Done
```

8. Read final messages.

You will now see the final messages

```
Doing some cleanup ... Done
Rewinding the tape ... Done

Preparing to reboot from your hard disk ...
Done
```

The system now reboots from the SASH Partition and you should see the A/UX Stand-Alone Shell window as shown in Figure B-10.

9. Remove the tape cartridge.

Remove the tape cartridge and store it in a safe place.

You are almost ready to run A/UX. Go to "Getting Ready to Run A/UX 1.1" and "Running A/UX 1.1 for the First Time" for information on how to set system specific details.

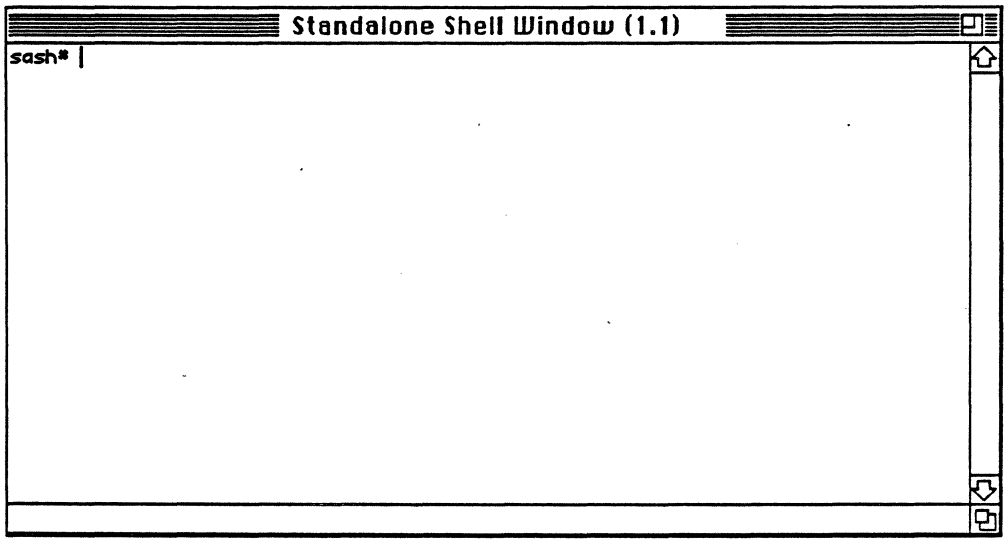

Figure B-10
A/UX Stand-Alone Shell (`sash`) window

Restarting from tape after interruption

You should not interrupt the installation process once you begin. If you interrupt the installation process (other than when instructed if you are placing the `/usr` file system on a separate partition), you will have to start the installation procedures over beginning with step 1 of "Launching the Installation Process."

The only situation in which you may be able to restart the installation after interruption is if your system experiences a power failure. When the power comes back on the installation routines are restarted. If the installation routines can recover you will see this message:

```
erase is DELETE

Welcome back to Part II of the A/UX cartridge tape
installation procedure.

Continuing installation with the xxxxxx files

You may not interrupt this procedure except at designated
points. To restart after an interruption, type the command
"/installer".

Press RETURN to continue [enter q to quit]
```

- Enter `q` if you want to exit from the installation procedure.
- Press RETURN to continue with the remaining portion of the installation.

Restoring files

You can also use the A/UX Tape Product or A/UX Floppy Product to restore original installation files that have been lost or damaged. See Appendix C, "Reusing the Installation Media."

Installing from 3.5-inch disks

You are now ready to begin final installation of A/UX. After you respond to a few prompts, the installation files are copied from 3.5-inch disks. The process of repeatedly inserting and removing disks takes between 1 ½ to 2 hours (estimate a little more than 3 minutes per disk).

1. Read the messages and press RETURN to proceed with the installation.

You will see a message like

```
erase is DELETE

Welcome to Part II of the A/UX floppy installation
procedure.  The next step will involve bringing all of A/UX
onto your hard disk from floppy disks.

If you have two floppy disk drives, be sure to insert all
disks in drive 0 when prompted.

It is not recommended that you interrupt this procedure
except at designated points. However, if you must do so,
you may type q when prompted to insert the next floppy
disk.

Note that if you do quit in this manner, you will have to
start over from the beginning.

Press RETURN now to continue [enter q to quit]:
```

Note that you can interrupt the procedure at only one designated point to prepare a second hard disk for installation of the `/usr` file system. Should you interrupt the installation process at any other time, see "Restarting from 3.5-inch Disk After Interruption" at the end of this section.

3. Choose optional files.

At this point you are given the choice of installing the optional files. The system displays a message like

```
Beginning with disk 1.

By default, this procedure installs /usr/catman and
/usr/games.  You may choose to install only a subset of
these files if desired.

Install both (catman and games)? [y/n, default=y]:
```

- Press RETURN or enter `y` if you want to install both sets of optional files.
- Enter `n` if you do not want to install both sets of optional files.The system then displays the size of the optional files with two messages like this:

  ```
  /usr/catman requires approximately nnnn Kbytes.
  /usr/games requires approximately nnnn Kbytes.
  ```

  The system then gives you a choice for each of the two sets of optional files:

  ```
  Install /usr/catman? [y/n]:
  Install /usr/games? [y/n]:
  ```

  Enter `y` or `n` to accept or reject each of the two choices.

4. Insert the disks as prompted.

❖ *Note:* Insert all disks into 3.5-inch drive 0 (the drive on the right, if you have more than one drive). During the installation process, the system cannot recognize a disk inserted in any other drive. If you insert a required disk in another drive, you may have to remove the disk manually, or quit to eject the disk. If you quit, you must restart from disk 1.

Each disk (depending on the total file size) takes a little less than three minutes to install. When figuring the time required for the entire process, estimate somewhat more than three minutes per disk to allow for disk handling, interruptions, and delays.

For each disk in the set of installation disks, you will receive messages like

```
Installing basic root files.
 Waiting for floppy. Please Insert A/UX Installation Disk n
        [q to quit]
```

The `Waiting for floppy` message blinks until you insert the requested disk. Then the `Waiting for floppy` message is replaced by

```
Processing floppy disk n.
```

When the files on that disk are copied, the disk is ejected from the drive, and you see the message `Waiting for floppy` again for the next disk. Remove the ejected disk and insert the required disk. The process continues. Remember that if you quit you must start the installation procedures over beginning with step 1 of "Launching the Installation Process."

5. Specify whether you want `/usr` on a separate partition.

When the root files have been copied, you are given the opportunity to install the `/usr` file system on a separate hard disk. (During the final part of installation you will be given the opportunity to omit `autorecovery`).

```
ATTENTION: Ready to install basic /usr files
This will take about nn minutes.
Do you wish to install these files on a separate usr file
system? [y/n]
```

- **Enter `n` if you do not want to install a separate `/usr` file system.**

You will see the message

```
Please wait, installation in progress.
```

You will be prompted as before to insert and remove disks until all the `/usr` files have been copied. When the `/usr` files have been copied, proceed to step 6.

- **Enter `y` if you want to install a separate `/usr` file system.**

If you enter `y`, the system displays a message like

```
If you are using an external hard disk for the /usr
partition, be sure it is plugged in and turned on.  Make a
file system using mkfs (if necessary), then mount the new
file system on /usr.  When the file system is mounted,
continue the installation with the command "/installer".

*     *     *     *     *     *     *     *     *     *
                        CAUTION
Control of the installation procedure has temporarily been
released by the installer program.  However, certain
critical files have not yet been installed.

Do not attempt to use A/UX until you have finished the
installation.  Rather, make and mount the /usr file system
quickly and return to the installation program by entering
the command:  "/installer".  Do not reboot at this time.

Press RETURN when you have read and understand this
caution.
```

At this point the installation procedure stops so that you can make the file system on the other hard disk and mount it. Before doing so, note the command to be used to return to the installation. Refer to `mkfs`(1M) and `mount`(1M) for more information on making and mounting a file system.

Use `mkfs` to make the file system. You will need the size information that was previously returned by HD SC Setup when you partitioned the disk. You wrote this information down in step 3 of "Placing the `/usr` File System on a Separate Partition."

- Make the usr file system. You must double the number returned from HD SC Setup to specify the size to `mkfs`. For example, if HD SC Setup reported 78137, the `mkfs` command is

  ```
  mkfs /dev/dsk/c4d0s2  156274
  ```

  This makes the usr file system on the hard disk on SCSI ID number 4. The size value (156274) is calculated by using the value returned by HD SC Setup and multiplying this value by 2. If you are using an Apple hard disk, you do not need to supply any other options to the `mkfs` command; the default values are correct.

- Mount the usr file system with a command similar to this:

  ```
  mount /dev/dsk/c4d0s2   /usr
  ```

- Enter

  ```
  /installer
  ```

  to return immediately to the installation procedures. The installation procedures will continue with a message like

  ```
  erase is DELETE

  Welcome back to Part II of the A/UX floppy disk
  installation procedure.

  It is not recommended that you interrupt this procedure
  except at designated points. However, if you must do so,
  you may type q when prompted to insert the next floppy
  disk.

  Note that if you do quit in this manner, you will have to
  start over from the beginning.

  Press RETURN to continue [enter q to quit]
  Beginning with disk n.
  ```

- Press RETURN to continue with the installation and install the `/usr` files.

  After this message displays, you will see other messages like

  ```
  ATTENTION: Ready to install basic /usr files
  This will take about nn minutes.
  Please wait, installation in progress.
  ```

  The system continues with the installation process. You will be prompted as before to insert and remove disks until all the `/usr` files have been copied. Copying the `/usr` files takes about 30 minutes.

6. Read messages.

If you chose to install optional files, after the `/usr` files are copied, you will see other messages like

```
ATTENTION: Ready to install /usr/catman and /usr/games
(tape archive xxxx).

You have chosen to install: xxxx, ...
Please wait, installation in progress.
```

Continue to remove the previous disk and insert the required disk. If you are not installing certain files, only the appropriate disk numbers will be requested. Copying all optional files requires about 20 minutes.

When the copy process is complete, you see a message like

```
Finished with installation.

Activating closeout routine. This routine performs several
important functions necessary to return control to A/UX.
```

You will now see the final prompt

```
Do you wish to fill the autorecovery partitions? [y/n]
```

7. Enter `n` to omit filling the autorecovery partitions.

❖ *Caution:* If you physically removed the autorecovery partitions with HDSC Setup, you must answer n.

- ☐ Enter `n` if you do not want to fill the autorecovery partitions.
- ☐ Enter `y` if you want to fill the autorecovery partitions. You will see the messages

```
Making links ... Done
Filling autorecovery partitions ... Done
```

8. Read final messages.

You will now see the final messages

```
Doing some cleanup ... Done

Preparing to reboot from your hard disk ...
Done
```

The system now reboots from the SASH Partition and you should see the A/UX Stand-Alone Shell window as shown in Figure B-11.

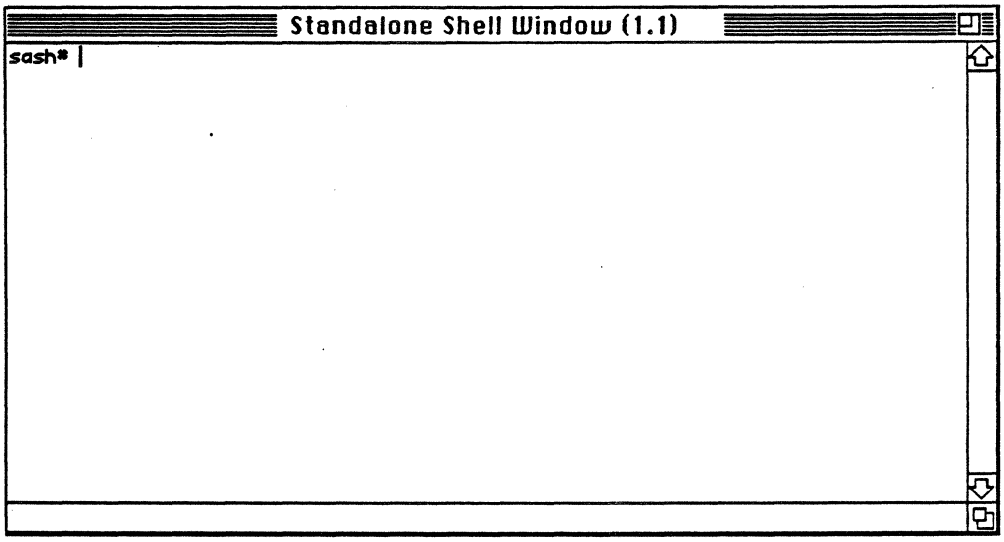

Figure B-11
A/UX Stand-Alone Shell (`sash`) window

You are almost ready to run A/UX. Go to "Getting Ready to Run A/UX 1.1" and "Running A/UX 1.1 for the First Time" for information on how to start A/UX and set system specific details.

Restarting from 3.5-inch disks after interruption

You should not interrupt the installation process once you begin. If you interrupt the installation process (other than when instructed if you are placing the `/usr` file system on a separate partition), you will have to start the installation procedures over beginning with step 1 of "Launching the Installation Process."

The only situation in which you may be able to restart the installation after interruption is if your system experiences a power failure. When the power comes back on the installation routines are restarted. If the installation routines can recover you will see the message

```
erase is DELETE

Welcome back to Part II of the A/UX floppy disk
installation procedure.

It is not recommended that you interrupt this procedure
except at designated points. However, if you must do so,
you may type q when prompted to insert the next floppy
disk.

Note that if you do quit in this manner, you will have to
start over from the beginning.

Press RETURN to continue [enter q to quit]
```

- Enter `q` if you want to exit from the installation procedure.
- Press RETURN to continue with the remaining portion of the installation.

Restoring files

You can also use the A/UX Tape Product or A/UX Floppy Product to restore original installation files that have been lost or damaged. See Appendix C, "Reusing the Installation Media."

Appendix C

Reusing the Installation Media

This appendix describes how to restore lost or damaged files to your hard disk from your installation media (the A/UX Tape Product or A/UX Floppy Product). You can restore only the installed system software from this media; you must keep separate backups of your own work.

Overview

Two sets of procedures describe how to copy one or more files from the A/UX Tape Product or A/UX Floppy Product. You can use these procedures to replace a damaged or lost file by copying the original file from the installation media.

Another procedure is used in special circumstances, such as when the very file you need to restore is required in the restore procedure (such as `cpio`). Certain of these files may be restored from the 3.5-inch disk titled *A/UX Floppy Root,* by using procedures described in "Restoring Essential Files."

All these procedures require some experience with the A/UX system. If you don't have this experience, see "Reference Information" at the end of this appendix.

Copying a file from cartridge tape

The installation files are stored on the cartridge tape in three major categories: root header and root files, `usr` header and `usr` files, and `opt` header and optional files. Figure C-1 shows the order.

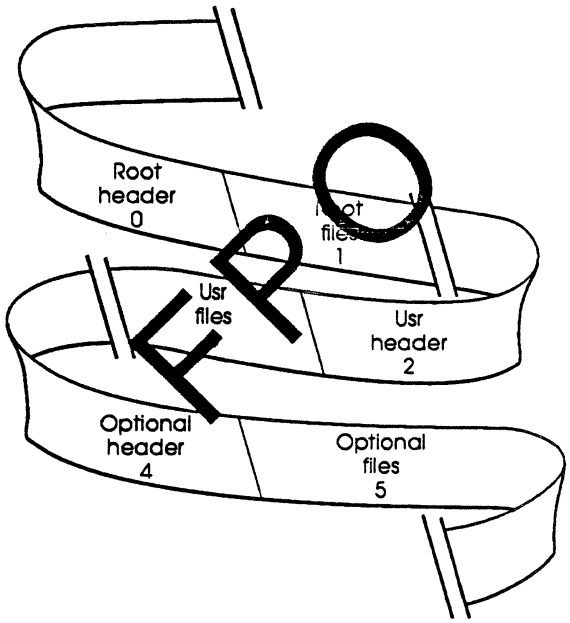

Figure C-1
Tape Cartridge File Layout

You can ignore the header files. They are quite short and contain (in uncompressed form) identification and positioning information used by the installation procedures. The file groups are quite large, are in compressed form, and contain the entire A/UX system as installed (except for the few files on the *A/UX Floppy Root* disk.).

You must first prepare your kernel for support of the Tape Backup 40SC if you have not already done so. See *A/UX Local System Administration* for information on creating a new kernel.

1. Rewind the tape cartridge.

The tape cartridge must be at the beginning of the tape to begin the process of finding the desired file location. To rewind the cartridge, use the `mt` command:

```
mt -f /dev/rmt/tcxn rew
```

2. Position the tape to the desired file location on the tape.

In terms of displacement from the start of the tape, the header files are at 0, 2, and 4; the file groups are displaced at 1, 3, and 5. These commands, which assume that the tape is at the beginning (or has been rewound), skip to the desired file location. The *x* in tc*x* stands for the SCSI ID number of your tape drive.

```
mt -f /dev/rmt/tcxn fsf 1 root files
mt -f /dev/rmt/tcxn fsf 3 usr files
mt -f /dev/rmt/tcxn fsf 5 optional files
```

The `n` following `tcx` specifies a no-rewind tape device, which ensures that after the skip command (`fsf` = forward space *count* files) the tape will remain at the correct location.

3. Retrieve the desired file from the tape.

When the tape has been properly positioned, extract the desired file(s) by using the command

```
dd if=/dev/rmt/tcx bs=8k | zcat | cpio\
   -idmu  filename[s]
```

(This is one command line, broken with the backslash (\) only to fit when printed here.) The input file (`if`) is the tape device represented by the device file, `/dev/rmt/tcx`. Using this device file causes the tape to rewind after the command completes. Note that you could use the nonrewindable tape device (`/dev/rmt/tcxn`) in this command. The output file is standard output.

The argument `bs=8k` specifies that a block size of 8K will be used when reading and writing data. The output of the dd command is sent through `zcat`, which will uncompress it "on the fly."

The uncompressed data is sent to `cpio`, which reads it (`-i` flag, for input) and places the named file or files in the working directory. The `cpio` command creates any necessary directories (`d` flag), preserves the file modification date (`m` flag), and copies the file unconditionally (`u` flag). (Normally `cpio` will not copy a file older than an existing file with the same pathname.)

`cpio` extracts the named files. See `cpio(1)` for information on using wildcard file designations to copy a group of files. Note that a filename should be specified without a leading slash (/); installation files are not archived with a full pathname.

If you are going to extract a file or files from two separate file groups, such as the root files and the optional files, you can use the given procedure twice; that is, do two sets of position and extract commands (the `mt ... fsf` command, followed by the dd command), with an automatic rewind occurring after each `dd` command. You can avoid the automatic rewind by using the no-rewind form of the `dd` command. For instance, using SCSI ID number 1 (`tc1`):

```
dd if=/dev/rmt/tc1n
```

The tape is now at the end of the file group specified by the original `mt ... fsf` command. Position to the next desired group of files with another `mt ... fsf` command (or even an `mt ... bsf` command, to back space files). The following example below extracts a file or files from the root file group and then from the optional file group.

First, the root files are extracted:

```
mt -f /dev/rmt/tc1n fsf 1
dd if=/dev/rmt/tc1n bs=8k | zcat | cpio\
   -idmu etc/passwd
```

At this point the tape is positioned at the `usr` header. Now skip to and extract from the optional files:

```
mt -f /dev/rmt/tc1n fsf 3
dd if=/dev/rmt/tc1 bs=8k | zcat | cpio -idmu\
  usr/catman/a_man/man.1m/init.1m.z
```

The `mt ... fsf 3` command skips the `usr` header, the `usr` files, and the `opt` header. The `dd` command extracts the desired file. The tape then rewinds because `n` was not specified.

Copying a file from a 3.5-inch disk

The installation files are stored, in compressed format, on 3.5-inch disks labeled *A/UX Installation Disk 1* through *A/UX Installation Disk 26*. Files are complete on a disk; that is, no file is split between installation disks. The last 3.5-inch disk in the set contains the index (in ordinary `cpio` format, not compressed) and is labeled *A/UX Floppy Disk Index;* its title (as seen by the system) is `Index`. The index lists all files in the A/UX Floppy Product and the 3.5-inch disk that the file can be found on.

Follow these steps to read the index from *A/UX Floppy Disk Index* into an appropriate directory on your hard disk:

1. **Change to the directory into which you will copy the index.**

   Change to an appropriate directory with the command

   `cd` *dirname*

2. **Insert *A/UX Floppy Disk Index* into 3.5-inch drive 0.**

   Insert the 3.5-inch disk into drive 0.

3. **Copy the index from *A/UX Floppy Disk Index* into your directory.**

   Enter

   ```
   cpio -iv < /dev/floppy0
   ```

   The `-i` flag tells `cpio` to read (input) the index and the `v` flag causes the index to appear on the screen.

4. Find the desired file from the index.

Consult the index to find the desired file or files. For example, to locate `/usr/bin/calendar`, enter

```
grep 'usr/bin/calendar' Index
```

Note that the installation files are not archived by full pathnames. Do not use the leading slash (/). (Do not use `'/usr/bin/calendar'`.)

In response to the `grep` command, you should see something like

```
08    usr/bin/calendar
```

The number `08` indicates that `usr/bin/calendar` is found on *A/UX Installation Disk 8* in this example.

5. Eject the 3.5-inch disk.

Eject the *A/UX Floppy Disk Index* 3.5-inch disk.

6. Copy the desired file from the appropriate 3.5-inch disk.

Insert the correct 3.5-inch disk into the drive (in this example, *A/UX Installation Disk 8*).

To copy the desired file into your working directory, enter

```
dd if=/dev/floppy0 skip=1 | zcat | cpio\
   -idmu  usr/bin/calendar
```

(This is one command line, which is broken with the backslash (\) only to fit when printed.) The input file (`if`) is the 3.5-inch disk, `/dev/floppy0`. The output file is standard output.

The argument `skip=1` indicates to skip the first block of data (header information) before copying to output.

The output of the `dd` command is sent through `zcat`, which will uncompress it "on the fly." The uncompressed data is sent to `cpio`, which reads it (`-i` flag, for input) and places the named file or files in the working directory. The `cpio` command creates any necessary directories (`d` flag), preserves the file modification date (`m` flag), and copies the file unconditionally (`u` flag). (Normally `cpio` will not copy a file older than an existing file with the same pathname.)

The file `usr/bin/calendar` is extracted from the 3.5-inch disk. See `cpio(1)` for information on using wildcard file designations to copy a group of files.

Restoring essential files

A small group of files essential to the installation process are not stored on the installation media (the cartridge tape or the 3.5-inch disks labeled with the word *Installation*). They reside on the 3.5-inch disk labeled *A/UX Floppy Root*. The files are

```
bin/cpio
bin/rsh
bin/sh
dev/*
etc/init
etc/inittab
etc/sysinitrc
nextunix
```

To copy most of these files, you mount the root 3.5-inch disk and copy the desired file. The files for which this procedure applies are

```
bin/cpio
bin/rsh
bin/sh
etc/init
etc/inittab
```

To mount the 3.5-inch disk, insert *A/UX Floppy Root* into drive 0 and enter

```
mount  /dev/floppy0 /mnt
```

Before you copy a file, it is recommended that you save a copy of the original file by moving the original to a new name and then copy in the root floppy version. For example, to copy `cpio` use

```
cd /bin
mv cpio cpio.old
cp /mnt/bin/cpio cpio
```

Restoring `bin/rsh` and `bin/sh` is a special case. The files are the same. Rename both, restore `/bin/sh`, and link `rsh` using the `ln` command:

```
ln  /bin/sh  /bin/rsh
```

Note that some of these files are so important that you cannot boot the A/UX system without them (for example, `etc/init`). In such a case, boot from another A/UX disk and then copy a good version of the file.

Certain files are special cases requiring special procedures. These files are

```
dev/*
etc/sysinitrc
nextunix
```

The standard A/UX device files (all the files in `/dev`) are stored in compressed form as a `cpio` archive. Note that this archive uses the `-c` option to `cpio`. To restore the file for a given *device-name,* mount the floppy root disk and then enter the commands

```
cd /dev
zcat /mnt/devices.cpio.Z | cpio -icumd device-name
```

You may wish to use `cpio -ict` to view the "Table of Contents," first.

The system initialization script, `/etc/sysinitrc`, is stored (for purposes of installation) under the name `etcsysinitrc`. To retrieve the installation version of it, enter the command

```
cd /etc
mv sysinitrc sysinitrc.old
cp /mnt/etcsysinitrc sysinitrc
```

It is not necessary to mount *A/UX Floppy Root* to recreate `/nextunix`. Simply bring your system up under `sash` and enter the command

```
echo '/unix' > /nextunix
```

Reference information

If you do not have some experience with using the A/UX system, you should work through *Getting Started with A/UX* before using these procedures. This material will help you become familiar with the `cd`, `ls`, and `pwd` commands, which are useful for navigating the directory structure.

Read (at least) some of the introductory material in *Local System Administration.* This material describes the major directories in your A/UX system and will help you locate the directory into which you will copy the desired file or files.

The commands used in these procedures are documented in Section 1 of the two-volume set *A/UX Command Reference.* See especially

```
cpio(1)
dd(1)
grep(1)
mt(1)
zcat(1)
```

The "see also" references and the permuted index can be used to find additional information on each command and associated functions.

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THE APPLE PUBLISHING SYSTEM

This Apple manual was written, edited, and composed on a desktop publishing system using Apple Macintosh® computers and Microsoft® Word. Proof pages were created on the Apple LaserWriter® Plus. Final pages were created on the Varityper® VT600™. POSTSCRIPT®, the LaserWriter page-description language, was developed by Adobe Systems Incorporated.

Text type is ITC Garamond® (a downloadable font distributed by Adobe Systems). Display type is ITC Avant Garde Gothic®. Bullets are ITC Zapf Dingbats®. Some elements, such as program listings, are set in Apple Courier, a fixed-width font.

7/30/88

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